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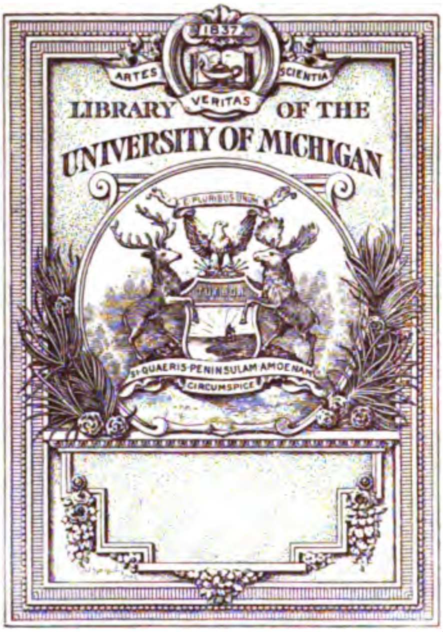
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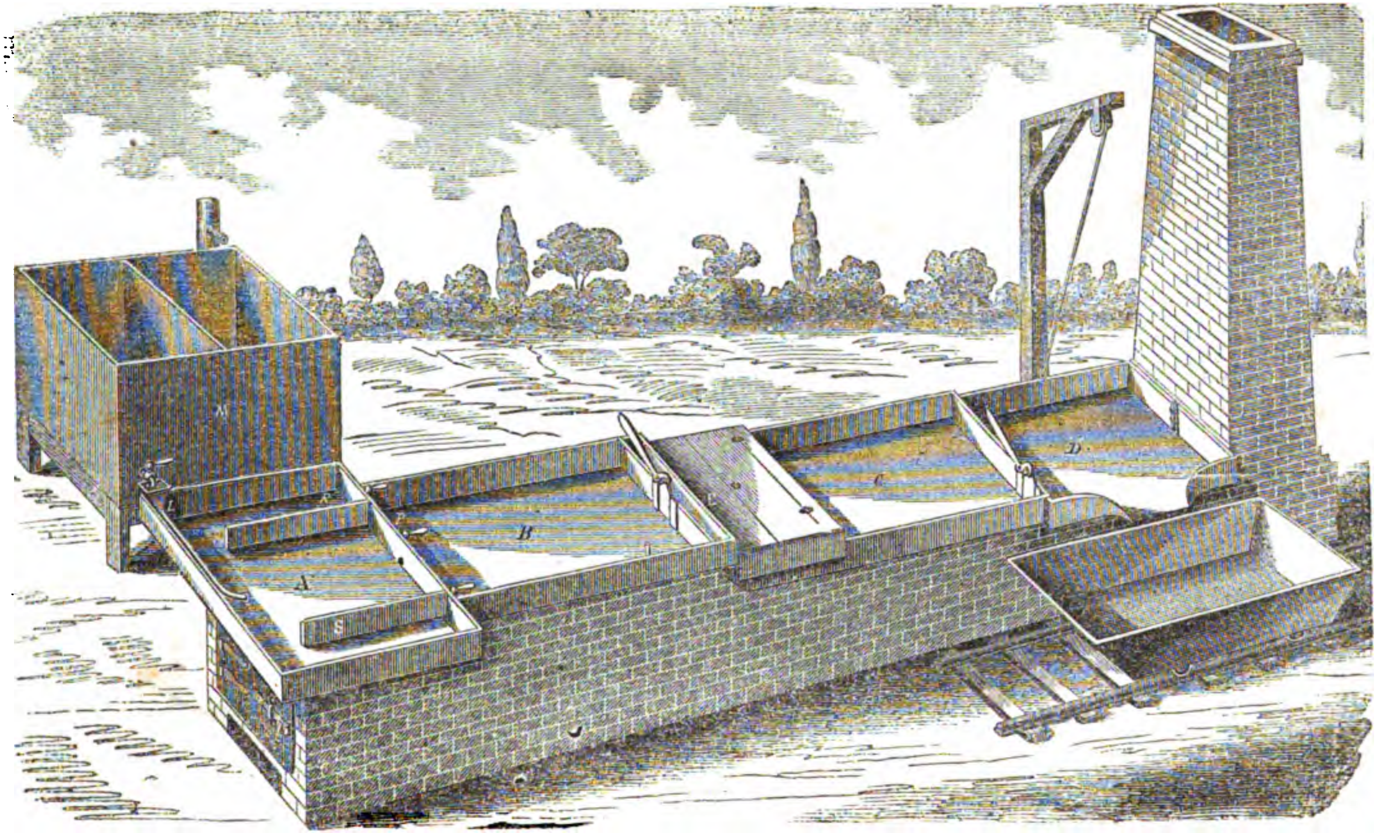


EVAPORATING RANGE—See article, "Sorghum and its Products."

THIRD ANNUAL REPORT

OF THE

State Board of Agriculture,

WITH AN

ABSTRACT OF THE PROCEEDINGS

OF THE

COUNTY AGRICULTURAL SOCIETIES OF MISSOURI,

TO THE

GENERAL ASSEMBLY FOR 1868.

JEFFERSON CITY:
ELLWOOD KIRBY, PUBLIC PRINTER.
1868.

SECTION 10, CHAPTER 59, REVISED STATUTES 1865:

"The Public Printer shall, annually, under the direction of the President of the State Board of Agriculture and the President of the State Horticultural Society, print and bind, in one volume, six thousand copies of the annual report of the said Board of Agriculture and the proceedings of the State Horticultural Society—thirty-eight hundred copies to be for the use of the General Assembly, two hundred for the State Library, one thousand copies for the State Board of Agriculture, and one thousand copies for the State Horticultural Society, for distribution to the agricultural, horticultural, and mechanical associations throughout the State."

Members of Board for 1868.

GOVERNOR THOMAS C. FLETCHER	Ex-officio members.
T. A. PARKER, *State Superintendent Public Schools*	
HENRY T. MUDD, *President*	Kirkwood.
GEORGE HUSMANN, *Vice-President*	Hermann.
WILLIAM T. ESSEX, *Treasurer*	Kirkwood.
FREDERICK MUENCH	Femme Osage.
JOHN W. HARRIS	Rocheport.
O. H. P. LEAR	Hannibal.
O. A. A. GARDNER	DeSoto.
BARNABAS SMITH	Cuba.
G. C. SWALLOW	Columbia.
DR. W. S. DYER	Vineland.
GERT. GŒBEL	Jefferson City.
N. C. COLMAN	St. Louis.
JOHN H. TICE, *Recording Secretary*	St. Louis.
L. D. MORSE, *Corresponding Secretary*	St. Louis.

153131

NOTICE.

The third annual agricultural report is presented to the farmers of the State with a feeling of assurance that it will be found quite as valuable as any of its predecessors, and probably more so. Most of the subjects presented are of direct practical importance to a proportion, greater or less, of the cultivators of our various soils.

Recognizing the great importance of Manufacturing to the wealth of the State and the permanent prosperity of the agricultural interest, considerable space has again been devoted to this subject, and the ideas and facts presented are respectfully commended to the attention of all readers; for on this subject every one is, or should be, deeply interested.

Wool Growing is rapidly becoming a leading interest in the State. Immense numbers of fine-wool sheep were driven into the State during the past year, and the superior advantages of large proportions of our domain for wool growing have attracted the attention of those interested in this branch of husbandry throughout most of the Northern States. The article of Mr. SAM. P. BOARDMAN, of Lincoln, Illinois, on Wool Growing in Missouri, will most admirably meet the wants of those who wish information on this important subject. Mr. BOARDMAN is one of the most extensive breeders of fine-wool sheep in the West, and one of our best and most practical writers on the subject of sheep husbandry. His excellent and somewhat extended article really makes quite a complete manual for the guidance of the western wool grower.

The subject of "Hemp and Flax," as presented by Mr. S. A. CLEMENS, now at Waverly, Missouri, is not second in value and importance to any other part of the volume. Mr. CLEMENS has devoted a large part of his life to the study of the subjects upon which he writes, and to the improvement of machinery for working these important fibers. He has treated his subjects in an able and thorough manner. No one who reads his article can fail to be interested. Hemp, by the use of improved machinery, will undoubtedly soon become a more important crop than ever. Flax, which is a still more important crop, has ever been sadly neglected in this State.

The subject of Entomology is one of growing interest. The annual losses by insects are becoming more and more serious. They filch from us a large part of our earnings, while we know very little of how to combat the enemy. There is an earnest demand for information on this subject that ought to be answered. Mr. C. V. RILEY, of Chicago, an accomplished entomologist, has kindly furnished us advance sheets of a brief report on the subject to the Illinois Horticultural Society. It will be read with interest.

Prussia is a country whose educational interests are advanced to the highest degree of perfection, where education is freely provided, and where the neglect of it is an offense against the laws and the public polity. The article on the "Progress of Agriculture in Prussia," translated from the French by Professor SMITH, will be found highly instructive.

Mrs. R. E. SMITH furnishes interesting articles on "Farmers' Sons" and "Farmers' Wives and Daughters." It is hoped that other ladies may be encouraged to contribute to the interest of future reports. To make our annual reports of greatest value and usefulness requires the presentation of a great variety of subjects, by a variety of persons, so that different views and diverse experiences may be obtained.

We thank our correspondents most heartily for their valuable aid and contributions, and we suggest that much more might be done in the same way very profitably to individuals and to individual localities. In this way practical men may greatly benefit each other and the State at large. It is greatly to be regretted that our county agricultural societies are not to a greater extent valuable auxiliaries to the Board of Agriculture, and valuable contributors to the reports. Such societies certainly ought to be so conducted, and probably are, as to develop important facts annually, and these should find a place in the State report. The attention of county societies is respectfully asked to this subject, as presented in an article in this report.

L. D. MORSE,
Corresponding Secretary.

JANUARY, 1868.

BOOKS, PAMPHLETS, AND PAPERS

RECEIVED BY DONATION AND EXCHANGE.

Colonel B. P. Johnson, Albany, New York, Secretary New York State Agricultural Society: Transactions for 1866.

John H. Klippart, Columbus, Ohio, Secretary Ohio State Board of Agriculture: copies of Ohio Agricultural Report for 1866.

S. L. Goodale, Saco, Maine, Secretary Maine State Board of Agriculture: copies of Maine Agricultural Report for 1866.

Charles L. Flint, Secretary Massachusetts State Board of Agriculture: copies Massachusetts Agricultural Report for 1867.

Sandford Howard, Lansing, Michigan, Secretary Michigan State Board of Agriculture: Michigan Agricultural Report for 1867.

Hon. Isaac Newton, Commissioner: copies of the Report of the Department of Agriculture for 1865, and monthly reports of the same.

J. W. Stokes, acting Commissioner of the Department of Agriculture: monthly reports, and annual report for 1867.

Hon. Horace Capron, Commissioner of Agriculture: Department Report for 1866.

Hon. C. A. Newcomb, Report of the Department of Agriculture for 1865, and Transactions of the Smithsonian Institute.

MAGAZINES: Horticulturist, F. W. Woodward, New York; American Journal of Horticulture, J. E. Tilton & Co., Boston; American Agriculturist, Orange Judd & Co., New York.

AGRICULTURAL PAPERS: Prairie Farmer, Prairie Farmer Company, Chicago; Rural World, N. J. Colman, St. Louis; Journal of Agriculture, L. D. Morse & Co., St. Louis.

NEWSPAPERS: State Times, Kirby & Cooper, Jefferson City, Mo.; Sedalia Times, Sedalia, Mo.

MISSOURI AGRICULTURAL COLLEGE LANDS.

STATEMENT OF THE REGISTER OF LANDS.

OFFICE OF REGISTER OF LANDS, Mo.,
CITY OF JEFFERSON, *January* 16, 1868.

To the Hon. the President of the Senate:

In compliance with the following resolution, adopted by the Senate on 9th of January—

> *Resolved,* That the Register of Lands be requested to furnish the Senate with a condensed statement of the report of commissioners to locate and select Agricultural College lands; also, how far the title has been perfected, and the amount in each county; the amount along and within six miles of the Southwest Pacific railroad, for which two acres of scrip were given for one; how much land is located outside of the six miles lands; the amount of arable, timber, and mineral lands, and their estimated value,"

I beg leave to submit the following:

The lists of selections filed by the commissioners in this office comprise an actual selection of 269,120 acres, standing for 337,520, on account of the lands in the railroad belt. The title to these lands has only so far been perfected as could be done until the conditions of the grant are complied with—namely, the withdrawal of these lands from market.

The lands are distributed as follows:

Lawrence county—12,480 acres in railroad belt, 1,120 outside; actually 13,600 acres, charged as 26,080 acres. This land is described as timbered, agricultural land, and valued at $2 50.

Webster county—3,040 acres in railroad belt; timbered, agricultural land, valued at $1.

Newton county—24,000 acres in railroad belt, and 7,200 outside, actually 31,200 acres, charged as 55,200 acres; partly agricultural and timbered, and partly mineral, valued at $1 25.

Crawford county—1,040 acres in railroad belt, 800 outside; actually 12,400 acres, charged as 24,320 acres; timbered, agricultural, and partly mineral, valued at $1 25.

Pulaski county—3,360 acres in railroad belt, charged as 6,720 acres; agricultural, timbered bottom land, valued at $1 25.

Laclede county—12,500 acres in railroad belt, 10,640 acres outside; actually 23,200 acres, charged as 35,760 acres; timbered, agricultural land, and valued at $2 50.

Cedar county—2,600 acres outside of railroad belt; agricultural, partly timbered and partly prairie, with coal, and valued at $1.

Benton county—3,680 acres outside of railroad belt; timbered, agricultural land, valued at $1 25.

Barry county—2,880 acres outside of railroad belt; timbered, agricultural land, valued at $1 25.

Jasper county—1,600 acres outside of railroad belt; timbered, agricultural land, valued at $2 50.

McDonald county—7,840 acres outside of railroad belt; timbered, agricultural, part bottom, part table lands, valued at $1.

Dallas county—3,840 acres outside of railroad belt; timbered, table lands, valued at $1 25.

Polk county—2,240 acres outside railroad belt; timbered, table lands, valued at $1 25.

Ripley county—9,600 acres, timbered, agricultural lands, and valued at $1 50.

Oregon county—10,240 acres; partly timbered, agricultural and partly mineral lands, and valued at $1 25.

Howell county—54,080 acres; timbered, agricultural lands, and valued at $1.

Butler county—17,120 acres; timbered, agricultural lands, and valued at $1 50.

Dunklin county—3,840 acres; timbered, agricultural lands, and valued at $1 25.

Wayne county—15,040 acres; timbered, agricultural lands, and valued at $1 50.

Shannon county—26,240 acres; partly heavily timbered, agricultural (suitable for small grain), and partly mineral (copper), and valued at $1.

Texas county—12,160 acres; partly timbered, agricultural, and partly mineral lands, and valued at $1.

Ozark county—1,280 acres; timbered, mineral lands, and valued at $1.

Taney county—3,200 acres; timbered, agricultural lands, and valued at $1.

The above valuations were placed upon the lands by the various representatives of their respective counties, as an average market price, and if the lands were sold at the above enumerated estimates, would realize the sum of $366,480.

I have the honor to be your humble servant,

JARED E. SMITH, *Register of Lands.*

PROCEEDINGS

OF THE

MISSOURI STATE BOARD OF AGRICULTURE.

ROOMS OF THE BOARD OF AGRICULTURE,
ST. LOUIS, *Wednesday, December* 4, 1867.

This being the day fixed by statute for holding the annual meeting of the Missouri State Board of Agriculture, there were

Present—Messrs. Wm. T. Essex and Henry T. Mudd, of St. Louis county; O. H. P. Lear, of Marion county; O. A. A. Gardner, of Audrain county, and G. C. Swallow, of Boone county.

There not being a quorum present, the board adjourned to 10 o'clock to-morrow morning.

JOHN H. TICE, *Recording Secretary.*

THURSDAY, *December* 5, 1867.

The board met pursuant to adjournment.

Present—Same as yesterday, together with George Husmann, of Gasconade county, and John W. Harris, of Boone county.

Absent—Dr. W. S. Dyer, of Jefferson county; Gert. Gœbel, of Franklin county; Frederick Muench, of Warren county; Francis Kellermann, of Washington county, and B. Smith, of Crawford county.

A quorum being present, the board proceeded to business.

Mr. D. W. Bryant, president of the Jefferson County Agricultural Association, presented his credentials, and took his seat, according to statute, as an *ex-officio* member.

Wm. T. Essex, Treasurer, made the following report of the receipts and expenditures since the last annual meeting:

Wm. T. Essex, Treasurer, in account with Missouri State Board of Agriculture.

1867.			
January 8	To balance of cash on hand		$731 91
May 8	amount of annual appropriation		2000 00
	statutory appropriation for two years		200 00
			$2931 91
	CONTRA.		
February 9	By amount paid J. H. Tice	$12 50	
	" " E. C. LeBourgois (rent)	75 00	
March 2	" " J. H. Tice	12 50	
	" " L. D. Morse	350 82	
April 4	" " J. H. Tice	12 50	
6	" " E. C. LeBourgois (rent)	75 00	
8	" " L. D. Morse	166 66	
May 13	" " J. H. Tice	12 50	
	" " L. D. Morse	176 66	
June 7	" " L. D. Morse	166 66	
	" " J. H. Tice	12 50	
July 1	" " L. D. Morse	170 66	
	" " J. H. Tice	12 50	
	" " E. C. LeBourgois (rent)	75 00	
August 5	" " J. H. Tice	12 50	
	" " L. D. Morse	172 16	
September 2	" " L. D. Morse	166 66	
	" " J. H. Tice	12 50	
October 1	" " J. H. Tice	12 50	
4	" " R. P. Studley & Co	24 15	
5	" " E. C. LeBourgois (rent)	75 00	
8	" " L. D. Morse	169 56	
November 2	" " L. D. Morse	177 16	
	" " J. H. Tice	12 50	
December 3	" " J. H. Tice	12 50	
	" " L. D. Morse	168 81	
4	By balance	584 45	
			$2931 91
	To balance brought down		584 45

J. H. Tice, Recording Secretary, submitted the following copy of the transactions of the Executive Committee, showing a detailed statement of the accounts audited, and that warrants had been drawn on the Treasurer for $2,347 46:

ANNUAL REPORT OF TRANSACTIONS OF EXECUTIVE COMMITTEE.

The Executive Committee of the Missouri State Board of Agriculture beg leave to submit the following report of its transactions since the last annual report made in January, 1867:

1867.		1867.
February 1	Audited account of J. H. Tice, for salary	$12 50
5	“ “ E. C. LeBourgois, for three months' rent to date	75 00
March 1	“ “ J. H. Tice, for salary	12 50
	“ “ L. D. Morse, for three months' salary	333 32
	“ “ express charges to Jefferson City	3 00
	“ “ traveling expenses from Jefferson City	4 50
	“ “ one-half cord hickory wood for office	7 00
	“ “ postage stamps	3 00
April 4	“ “ L. D. Morse, for salary	166 00
	“ “ J. H. Tice, for salary	12 50
6	“ “ E. L. LeBourgois, for rent to May 5	75 00
May 10	“ “ J. H. Tice, for salary	12 50
	“ “ L. D. Morse, for salary	166 66
	“ “ same, for postage	10 00
June 5	“ “ same, for salary	166 66
	“ “ John H. Tice, for salary	12 50
July 1	“ “ same, for salary	12 50
	“ “ L. D. Morse, for salary	166 66
	“ “ express charges	2 00
	“ “ for cleaning room	2 00
	“ “ for rent to Bourgois to August 5	75 00
August 1	“ “ J. H. Tice, for salary	12 50
	“ “ L. D. Morse, for salary	166 66
	“ “ same, for expenses	5 50
15	“ “ R. P. Studley & Co., for printing and stationery	24 15
September 2	“ “ L. D. Morse, for salary	166 66
	“ “ J. H. Tice, for salary	12 50
October 1	“ “ same, for salary	12 50
5	“ “ E. L. LeBourgois, for rent to November 5	75 00
8	“ “ L. D. Morse, for salary	166 66
	“ “ of expenses	2 90
November 1	“ “ J. H. Tice, for salary	12 50
	“ “ L. D. Morse, for salary	166 66
	“ “ postage	5 50
	“ “ one-half cord of wood for office and sawing	5 50
December 2	“ “ J. H. Tice, for salary	12 50
	“ “ L. D. Morse, for salary	166 66
	“ “ expenses	2 15
		$2,347 46

On motion, the report of the Treasurer and the report of the Executive Committee were referred to a committee of two for examination.

The President appointed Messrs. Harris and Lear said committee.

Dr. Morse, Corresponding Secretary, reported that his annual report was not ready, but in a state of preparation, and would be completed as soon as possible after county reports were all recceived, which were daily coming in.

Mr. Harris submitted resolutions relative to employing a State geologist and entomologist, which resolutions were referred to a committee consisting of Professor Swallow, L. D. Mcrse, and J. H. Tice.

PRIZE ESSAYS.

Mr. Gardner stated that certain essays, for which premiums had been offered by the board, had been referred to a committee at the last annual meeting. No formal report had been made by the committee. He, therefore, as chairman of said committee, would respectfully report that the committee had examined the essays, and had awarded the premium to an essay entitled "Manufacturing in Missouri," which is published in the last annual report; that said essay was written by Mr. John F. Madison, and he, therefore, was entitled to the premium offered, namely, twenty dollars.

On motion of Mr. Harris, it was ordered that the Executive Committee issue a warrant on the Treasurer for twenty dollars in favor of John F. Madison, the amount of premium offered for best essay on manufacturing in Missouri.

ELECTION OF NEW MEMBERS.

On motion, the board then proceeded to fill the vacancies existing in the board by the expiration of the term of service of the following members: Messrs. Wm. T. Essex, of St. Louis county; O. A. A. Gardner, of Audrain county; John W. Harris, of Boone county, and Francis Kellermann, of Washington county.

Messrs. Swallow and Husmann were appointed tellers.

First ballot for vacancy of Mr. Essex, resulted in the re-election of Mr. Essex.

Second ballot, to fill vacancy of Mr. Gardner. Mr. Gardner being in nomination, he stated that he had changed his residence from Audrain to Jefferson county, which latter had already a member in the board; he would, therefore, decline the nomination. Ballot resulted in re-electing Mr. Gardner.

Third ballot ordered to fill vacancy of Mr. John W. Harris, Mr. Harris being in nomination.

Mr. Harris said that as Boone had already a member in the board, he thought that the vacancy should be filled by electing some one in a county not represented; he therefore begged leave to decline. Ballot resulted in the re-election of Mr. Harris.

Fourth ballot ordered to fill the vacancy of Mr. Kellermann.

Mr. Harris said that although it was desirable that all sections of the State should be represented in the board, yet as it was desirable that on an emergency, when a session of the board became necessary, that a quorum could be had without fail, he, therefore, thought some one should be elected, either from St. Louis county or from a point convenient to it, and one that would not fail to attend. At present there is either an apathy or want of general interest, that members from a distance could not be calculated upon to attend, especially to called sessions of the board. Until a change indicating more zeal and interest in the State generally is manifest, members must be selected with reference to their attendance, and not with reference to locality.

Prof. Swallow coincided with the remarks of his colleague, and he therefore would nominate Norman J. Colman, of St. Louis.

Mr. Lear seconded the nomination, and sustained it by a few pertinent remarks. The ballot resulted in the election of Mr. Colman.

THE AGRICULTURAL COLLEGE LANDS.

Mr. Lear said he believed the business of the annual meeting was now about completed, at least if it was not it was about time to adjourn over and have an afternoon session. Whether he could or could not attend depended upon circumstances, as he contemplated returning home in the afternoon train. Fearing that he might not be able to attend, he asked the indulgence of the board for a few moments to express his views upon some matters that he deemed should receive immediate attention from the board and early action from the Legislature. That subject was the agricultural college lands of the State—their condition, value, and what measures are to be taken to make them available for the purpose intended by Congress. This subject required careful consideration from the board. He had a feeling that if this board did not charge itself with the duty of seeing after this matter that no one else would, and the result would be that this munificent donation would be frittered away without doing anybody any good excepting a few sharp speculators. If the board will not charge itself with looking after all interests that affect the agricultural prosperity of the State, and see that proper legislation is had to protect and advance that interest, then this board had better be abolished. There was no surer way to popularize this board than to do this on all matters requiring the fostering care of wise legislation, especially that of agricultural education. This board, representing the greatest interest in the State, ought to have, and he believed did have, influence enough, if properly exercised, to secure any proper legislation that it may desire. Notwithstanding the rumors of log-rolling and external pressure and influence charged against legislatures generally, he had no doubt this board would find that the Legislature about to reassemble would give a careful and respectful consideration to any proper bill this board might prepare for its action.

By the act of Congress the State is entitled to 330,000 acres of land. Commissioners had been appointed to select those lands, and they had at least in part, if not in totality, made that selection. Neither the people of the State nor this board knew in what manner the commissioners had discharged the duty imposed upon them. Rumors are flying about that the commissioners never saw the lands, and 'that they selected from maps designating unentered land without personal inspection or even as much as inquiry into their condition. He hoped these rumors would prove untrue upon investigation ; but granting that they have conscientiously performed their duties, it is the right and the privilege of this board, and of the people of this State, to know what has been done, and what is the present and prospective value of these lands. He believed it would be decidedly bad policy to sell the lands at present; first, because no one knew what the lands were worth, and their locality was favorable for interested parties who wished to seize them to make the public believe they were worthless; second, because they are located in a section of the State that has not now but shortly will have commercial facilities. It is, then, an act of prudence to hold the lands for the present from sale, and to derive all the advantages of the rise of land that must ensue from the completion of the Southwest railroad. Even then he would not favor a sale, but a lease for a number of years. The sale of these lands at any time will open a wide door for corruption; and it behooves the board to take warning what will happen by what has happened in reference to the sale of school lands in the city of St. Louis. In 1854 I received the first annual report of the St. Louis public schools, made by our Recording Secretary, then superintendent of these schools, in which there is a graphic historical detail of the plundering of the school fund practiced by interested parties, who were either members of the board or who sent their friends into wards to be elected to the school board whenever there was a vacancy. The public, it seems, for a long time was indifferent to this plundering, but finally had the charter so amended that no person was eligible as a member who was either directly or indirectly interested in any claim adverse to the schools, or who had not lived in the ward one year prior to the election. This shut down on the speculators, and to the members who then changed the system of selling to that of leasing the citizens of this city owe a debt of gratitude that they never can pay. My policy for the disposition of the agricultural college lands is to adopt that of leasing, as in this city, the leases to run twenty, twenty-five, or even thirty years, and renewable for a like term, or, if sold, to give lessee preference. These measures ought to be pressed immediately before the Legislature, and proper statutes passed to protect these lands, and preserve them for the benefit of future generations.

On motion, the board adjourned to three o'clock P. M.

AFTERNOON SESSION.

The board met pursuant to adjournment. Present, same as in the forenoon.

Mr. Harris, from committee on Treasurer's account, made the following report, which was accepted and adopted, and the committee discharged:

MR. PRESIDENT: The committee on Treasurer's account would beg leave respectfully to report that they have examined the Treasurer's account current, and find the same correct as per vouchers filed with the report.

J. W. HARRIS, *Chairman.*

On motion, the annual meeting was then adjourned sine die.

JOHN H. TICE, *Recording Secretary.*

NEW BOARD.

THURSDAY, *December 5*, 1867.

Mr. Mudd called the board to order, and nominated Professor Swallow as President pro. tem., which was carried.

The Secretary then called the roll, and the following members answered to their names:

Messrs. N. J. Colman, Wm. T. Essex, and Henry T. Mudd, of St. Louis county; O. A. A. Gardner, of Jefferson county; J. W. Harris and G. C. Swallow, of Boone county; Geo. Husmann, of Gasconade county, and O. H. P. Lear, of Marion county.

A quorum being present, the President pro tem. stated that the object of the meeting was to organize by the election of officers for the ensuing year.

On motion, the board then proceeded to the election of officers for the ensuing year, Messrs. Harris and Gardner acting as tellers. Ballots were had for the respective officers, which resulted as follows:

President—Henry T. Mudd;
Vice President—George Husmann;
Recording Secretary—John H. Tice;
Corresponding Secretary—L. D. Morse;
Treasurer—Wm. T. Essex;

—who were declared duly elected for their respective offices for the ensuing year.

Professor Swallow, from the committee to which had been referred resolutions relative to a State geologist and entomologist, made the following report, which was adopted, and committee discharged:

MR. PRESIDENT: The committee to which were referred certain resolutions respecting the appointment of State entomologist and geologist, respectfully submit the following resolutions, and recommend their adoption by the board:

Resolved by the State Board of Agriculture, That we memorialize the General Assembly of this State to authorize this board to nominate, and the Governor to commission, a State geologist and a State entomologist, to hold their offices for two years and until their successors are appointed. The duty of the State geologist shall be to take charge of the affairs and property belonging to the geological survey of the State; to make an annual report or communication upon the economical geology of the State, for publication in the annual report of this board, and also, whenever the means for so doing shall be provided by the General Assembly, to collect, classify, and preserve, in the rooms of the board, specimens of the different kinds of rocks, minerals, fossils, and soils of the State. The duty of the State Entomologist shall be to describe the insects of the State, their habits and peculiarities, particularly those destructive to fruits and vegetables; and to collect, classify, and preserve, in the cabinet of the board, specimens of all insects, whether useful, noxious, or innoxious; and to report, for publication in the annual report of the board, his observations and suggestions upon their relation to agricultural economy, and the means of preventing their ravages by the destruction of such as are detrimental, and for the preservation and increase of such as are beneficial.

Resolved, That in order to carry out the object of the foregoing in regard to an entomologist in particular, we ask the General Assembly to make the appropriation for the use of the board $5000 per annum; the appropriation having been reduced last winter to an amount below our current expenses.

The President suggested that the subject introduced in the forenoon by Mr. Lear, viz., character, value, and disposition of the Agricultural College lands, should receive some attention before the board adjourned.

Professor Swallow said all we could do now was an interchange of views on that subject. Before any legislation could be asked for we must have facts about those lands which we do not now possess. He, therefore, would offer the following resolution:

Resolved, That when this board adjourns, it adjourn to meet in January next, at Jefferson City, at the call of the President.

Which resolution was adopted.

Mr. Colman said there were strong reasons to see that the Commissioners had been remiss in the discharge of their duties in selecting those lands. One of the reasons is, that the region of the State known as the Ozark mountain was plastered over with these locations. What, under the circumstances, was the value of these lands, whether anything, was a secret. The first step for the board was to ascertain whether these lands were valuable or worthless, and if the latter, whether patents have issued to the State for them; if patents have not issued, to ascertain whether the action of the commissioners cannot be set aside, and a new commission appointed. If the lands should prove to be valuable, a description of them should be in possession of the board. He, therefore, offered the following resolution, which was adopted:

Resolved, That the President and Corresponding Secretary be directed to address the Register of Lands and ascertain all the facts known of the Agricultural College lands, their location and value, and whether patents have issued from the government of the United States to the State of Missouri for them, and report to the January meeting.

THANKS.

Mr. Gardner submitted the following resolutions, which were adopted:

Resolved, That the thanks of the members of this board are due to the controlling officers of the several railroads of this State, who, heretofore, have passed the members of the board and its officers free over their roads.

Resolved, That the President present to the proper officers of the railroads in Missouri the fact that the members of this board are serving without pay or emolument of any kind, and, also, the great importance of the duties they perform for the development of the natural resources of our State, and respectfully request that free passes may be granted to the members and officers for the year 1868.

INDUSTRIAL UNIVERSITY.

Professor Swallow submitted the following resolution, which was adopted:

Resolved, That a committee of three be appointed to report what action is necessary for this board to take in reference to the location, organization, and government of the Industrial University.

The President appointed Messrs. Swallow, Husmann, and Gardner said committee.

The board then adjourned until to-morrow (Friday) at ten o'clock A. M.

NEW BOARD—SECOND DAY.

FRIDAY, *December* 6, 1867.

The board met pursuant to adjournment.

Present—Messrs. Colman, Dyer, Essex, Gardner, Harris, Husmann, Mudd, and Swallow.

INDUSTRIAL UNIVERSITY.

Mr. Husmann asked to be excused from serving on Committee on Industrial University, which was granted; and,

On motion of Professor Swallow, the President was appointed to fill the vacancy on the committee.

Professor Swallow stated that the Committee on Industrial University could not possibly report before the meeting at Jefferson City, in January, as it was necessary to obtain more information than was now in possession of the public; besides, he would like to hear the views of the individual members of the board, to see whether they could be harmonized respecting the matter of location, organization, and government of said university.

Whereupon, the following persons, upon being called on, expressed their views at length: Messrs. Swallow, Morse, Tice, Mudd, Harris, Colman, and Dyer.

Their views seemed to harmonize on the following points: Location to be left to open competition and assigned to the county making the best offer; no location or independent organization to be attempted, unless a fund from $300,000 to $500,000 be secured outside of the congressional endowment, unless the latter should prove more valuable than is now supposed; that wherever located it be an independent institution, under a separate organization from any other college or literary institution; that this board, representing the great industrial interests of the State, should have the controlling influences in its government, whatever the organization may be, and that the spirit if not the letter of the law of Congress contemplates a separation from all other literary institutions in its organization.

Professor Swallow suggested that the board appoint some one to prepare an address touching all matters relating to organization of the university, and the management and disposition of the Agricultural College lands, to be delivered before the board at its meeting in Jefferson City.

On motion of Mr. Colman, Professor Swallow was appointed to perform that duty.

Mr. Mudd presented a bill of $25 50, for personal expenses incurred in attending to the business of the board at Jefferson City at divers times, which was allowed, and warrant ordered for amount.

On motion, the board then adjourned, to meet at Jefferson City in January, 1868, at call of President.

JOHN H. TICE. *Recording Secretary.*

CHARACTER OF SEASON AND CONDITION OF AGRICULTURE FOR 1867.

COUNTIES.	CHARACTER OF THE SPRING.	SUMMER.	AUTUMN.	CHARACTER OF CROPS OF FRUIT.	CULTIVATION OF GRAPES.	CONDITION OF FRUIT CULTIVATION.	GRAIN, CROPS, ETC.
St. Genevieve	Quite wet.	Dry.	Very dry.	Peaches, a full crop; apples, below the average; pears, full crop.	Three hundred thousand vines cultivated in this county.	Increasing. Catawba grape most cultivated; suffered from blight.	Corn, oats, and hay better than last year; wheat and barley, not as much in quantity, but better quality than last year; both seasons below general average.
St. Charles...	Dry and warm.	Dry.	Dry.	Peaches, full crop; other fruit average.	Grapes much cultivated; complaint of blight and rot.	Increasing rapidly.	Corn as good as common; wheat, oats, and barley, average; hay short on account of dry season.
Franklin.....	Wet.	Dry.	Dry.	Apples and peaches, large crops; no pears raised.	....	Grape injured by drouth. Not much blight or rot.	Corn, two-fifths crop; wheat, full average; oats, good; hay, extra; vegetables grew well.
Barry..........	Wet and cold	Seasonable—just right.	Very dry and pleasant.	Average crop.	Not cultivated—wild abundant.	Increasing.	Corn, wheat, and oats, double last year; no barley; hay, short crop.
Mississippi..	Very wet.	Very wet to July 19.	Dry.	Apples, fair crop; peaches, very good; pears, not raised.	Cultivation of apples and peaches increasing.	Not cultivated.	Corn crop fair on low land; wheat, good; oats and barley, none; vegetables below average.
Caldwell......	Dry.	Unusually dry.	Dry.	Apples and peaches, average; pears injured by frost in spring.	Cultivated but little—suffer from blight.	Increasing.	Corn, wheat, and hay, good—above average.
DeKalb........	Wet.	Seasonable.	Very dry.	Apples, peaches, and pears, good.	None cultivated—plenty of wild.	....	Corn, wheat, oats, good; barley, none raised; prairie hay mostly used; crops above average.
Livingston..	Warm and pleasant; rain av.	Hot and dry.	Warm and dry—much thunder.	Apples and pears, extra crop; peaches plenty, but small.	Increasing largely.	Increasing.	Corn, wheat, oats, and barley, extra crop; vegetables of all kinds, good crop and quality.
Holt...........	Variable.	Warm.	Rather dry.	Apples, peaches, and pears, extra crop	Injured by rot, but better than last year.	....	Fall wheat entirely destroyed by grasshoppers; spring wheat injured when nearly ripe; oats and barley, ditto.

Character of the Season, etc.—Continued.

COUNTIES.	CHARACTER OF THE SPRING.	SUMMER.	AUTUMN.	CHARACTER OF CROPS OF FRUIT.	CULTIVATION OF GRAPES.	CONDITION OF FRUIT CULTIVATION.	GRAIN, CROPS, ETC.
Marion.......	Wet and cold	Very dry.	Very dry.	Apples, poor quality, spoiled by worms, one-fourth crop; peaches and pears, small—one-fifth crop.	None cultivated.	Increasing.	Wheat, oats, and hay one-fourth above average; corn, one-third crop, about 13 bushels per acre; barley not cultivated.
Osage.........	Late and wet	Sultry and damp.	Dry and warm.	Fruit crop, good; apples and peaches average; pears plenty.	Rot badly, except on southeast exposures.	Increasing.	Corn, half crop, about 15 bushels per acre; oats, wheat, barley, and hay above average.
Jefferson.....	Very wet, cold and late.	Dry.	Dry.	Fruit of all kinds good.	Extensively cultivated, and increasing.	....	Corn, half crop; wheat, average; oats, good; barley, little raised; hay, very heavy.
Callaway. ...	Cold.	First half hot and moist; last half hot and dry.	....	Fruit mostly light and inferior.	Not much cultivated; what few are grown not injured by blight or rot.	Increasing.	Wheat, full crop; oats, same; rye, same; corn, one-half crop.
Iron............	Rather dry.	Hot and dry.	....	Apples, half crop; peaches, all that could be desired; other fruits abundant, good quality.	Wasted a good deal.	Increasing.	Corn, not good; oats and hay, first-rate—more than average.
Vernon.......	Dry and cool	Dry and warm.	Very dry.	Apples, trees bore well; peaches failed on high ground, one-half crop on low, mostly seedlings; pears scarce.	None cultivated.	Increasing.	Corn, early planting, good; late, one-half crop; oats, above average; wheat, injured by grasshoppers; barley none.
Platte.........	Dry.	Dry.	Seasonable.	Apples, indifferent; pears, good crop; peaches, same.	Grapes fine; very little rot.	Increasing.	Corn, oats, and barley crops gone, in some places destroyed by grasshoppers.
Putnam.......	Wet and cool	Dry.	Dry.	Apples, abundant; peaches and pears, fair crops.	Few cultivated; no blight or rot.	....	Fall wheat good; oats and hay extra; corn, not a large yield. All grain less than last year.

Carter	Favorable.	Dry.	Dry.	Apples, a full crop, but injured by rot; pleaches plenty and good; pears scarce.	Grapes do well—are free rot.	Increas'g very rapidly.	All crops less than average. Average of corn 40 bushels to the acre in good years.
Oregon	Cold and wet	Dry.	Dry and warm.	Fruit crop very poor; apples, one-half crop; peaches, one-fourth crop; pears, none.	Almost total failure; blight badly on low ground.	Increasing.	Corn, one-half crop; wheat, little better; oats, two-thirds crop; crops one-half average.
Bates	Cold and wet	Dry.	Dry.	Apple crop very good, but small; peaches, one-half crop.	Not much cultivated.	Much young fruit planted every year.	Corn crop very good; winter wheat all eaten by grasshoppers; oats and spring wheat badly injured by same.
Greene	Early part, wet; late, cold, dry.	Very seasonable.	Very dry.	Full crops, except grapes, which were injured by rot and blight.	Not much cultivated.	Increasing.	Wheat, fifty per cent. better than last year; corn, double; oats and hay not quite so good; whole crop above average.
Cass	Wet and cool	Favorable.	Cool and wet	Fruit crop small; apples much injured by worms.	Increasing.	Increasing.	Corn crop, very fine; wheat, good; oats and barley, not much raised; potatoes, extra fine—15 bushels seed produced 400 bushels.
Wayne	Cold and wet	Very dry.	Dry and pleasant.	Apples and peaches, an average crop.	Grapes not much cultivated.	Increas'g very much.	Corn, wheat, and oats, average; wheat, damaged in some localities by water last May.
St. Clair	Very wet.	Dry and hot.	Very dry.	Apples, full crop; peaches, not average; pears, not cultivated.	Not cultivated.	Increasing.	Corn, below average; wheat, extra good; oats, good; no barley cultivated; crops generally below average.
Sullivan	Cold and wet	Dry and hot.	Dry.	Fruit crop was good.	Grapes not much cultivated.	……………………	Corn, about two-thirds crop; wheat and oats, full crop, above average; hay, good; potatoes, medium.
Phelps	Uncommonly cold and wet.	Dry and hot.	Very dry.	Apples, fine crop; on seedling trees good, budded trees killed by frost; pears do well.	Grapes good; no signs of rot or mildew, except Isabella.	Increasing rapidly.	Corn, one-half the crop of 1866; oats and barley, same as last year; wheat and hay, one-third more.
Randolph	Cold and wet	Favorable.	Dry.	Apples in most localities good; peaches a failure.	Grapes not much cultivated.	Increasing slowly.	Corn, not quite an average; oats, good; barley, none sown; wheat, good; hay, above average.

Character of the Season, etc.—Continued.

COUNTIES.	CHARACTER OF THE SPRING.	SUMMER.	AUTUMN.	CHARACTER OF CROPS OF FRUIT.	CULTIVATION OF GRAPES.	CONDITION OF FRUIT CULTIVATION.	GRAIN, CROPS, ETC.
Holt..........	Unusually backward.	Wet in last of season.	Dry.	Fruit crop very good; apples, above average; peaches, large crop; pears, good.	Grapes better than last year.	Much pains are taken to improve fruit.	Corn, better than average; wheat, oats, rye, and barley, and timothy and clover, much injured by grasshoppers.
Greene........	Cold, wet and late.	First half wet and warm; last half warm and dry.	Dry and warm.	Full crop of all kind of fruit.	Grapes not much cultivated.	Fruit is cultivated extensively.	All crops better than last year, except wheat, which is three-fourths crop.
Howell.	Cold and wet	Dry and hot.	Dry and warm.	Half crop of apples; few peaches; no pears cultivated.	Grapes not cultivated.	Very little increase in cultivation.	Corn, half crop; wheat, one-third; oats, good; no barley and but little hay raised.

RECORD OF EVENTS AND WEATHER FOR 1867,

AT KANSAS CITY.

January—1st, river closed above the city to-day. 10th, snowed; also on the 13th, 20th, 24th and 29th: five times. 10th to 12th, very pleasant; balance of the month rather boisterous. 21st, heavy fall of snow all over the country; eighteen inches in St. Louis; none here. 24th, the only fall of rain during the month: one time.

February—7th, snowed; also, on the 21st: two times. 9th, rained; also, on the 19th and 20th: three times. 11th, ice broke up in the river. 15th to 16th, tolerably pleasant; balance rough; latter part very muddy; warm.

March—3d, snowed; also, on the 4th, 6th, 8th, 11th, 15th, 18th, 21st, 22d, 25th and 31st: eleven times. 14th, coldest day of the year; mercury 14° below zero at daylight. 21st, rained; also, on the 23d, 25th and 26th: four times. 27th, very rough weather; cold and windy. 28th to 31st, very pleasant.

April—1st, snowed; also, on the 10th: twice. 14th, latest frost of spring. 1st to 10th, very unpleasant; 11th to 30th, mostly very pleasant, with much wind. 1st, rained; also, on 3d (two thunder showers), 8th, 9th, 14th, 15th, 18th and 27th: nine times. 24th, felt smart shock of an earthquake at 2.20 P. M. 23d to 27th, river higher than for twenty-three years. 1st to 12th, very dry for the season of the year.

May—8th, rained; also, on the 11th, 12th, 15th, 18th, 19th, 20th, 21st, 26th, 27th, 28th and 31st: twelve times. 9th, grasshoppers hatching out in immense numbers in sunny places. 13th, cold and blustering; pleasant and seasonable weather balance of the month.

June—1st, rained; also, on the 10th, 14th, 15th, 18th, 25th and 26th: seven times. 3d, grasshoppers innumerable, about half grown, and very voracious. 25th, grasshoppers beginning to depart in swarms, flying very high. Fore part of the month unusually warm; balance delightful.

July—4th, rained; also, on the 9th, 11th, 14th, 19th, 27th and 31st: seven times. 14th, heaviest fall of rain during the year. 16th, grasshoppers all disappeared. Fore part of the month very pleasant; latter part excessively hot.

August—11th, hottest day of the year; mercury 96° in the shade at 3 P. M. 6th to 18th, very hot, dry and dusty; balance of month seasonable. 12th, rained; also, on the 19th, 23d, 25th, 30th and 31st: six times. 21st, cornerstone of the railroad bridge laid.

Septemrer—6th, rained; also, on the 10th and 20th: three times. 1st to 14th, quite seasonable. 15th to end of the month, very dry, hot and windy.

OCTOBER—8th, rained; also, on the 13th, 20th, 23d and 24th: five times. 1st to 8th, very hot, dry and dusty; balance very fine weather. 29th, cold. 12th, first frost of the season; quite light.

NOVEMBER—4th, first heavy frost. 1st to 3d, very dry, but pleasant. 24th to 30th, quite cold and disagreeable. 7th, excessively windy and dusty; wind from the south. 22d, last rail laid on the Cameron railroad. 24th, rained; sprinkled very slightly on the 10th and 23d; rained on the 28th: four times. 28th, first snow of the season, about three inches deep. 30th, coldest day of the fall; ice on ponds one inch thick.

DECEMBER—1st to 9th, very warm and pleasant; bricklayers still at work. 10th, rained; also, on the 11th, 12th, 19th and 20th: four times. 12th, warm again. 13th, snowed a little. 14th, cold and cloudy. 15th to 16th, clear and warm. 17th to 18th, cold wind from the north. 19th to 21st, cloudy and wet. 22d to 31st, very warm; clear and sunny; bricklaying progressing as in September.

RESUME.

Whole number of falls of snow, 21; the latest in the spring, April 10th; the earliest in the fall, November 28th; greatest depth at any one time was six inches.

Whole number of falls of rain (including very slight sprinklings), 63; the longest periods without any rain or snow were from September 20th to October 8th, and October 24th to November 10th (virtually to November 28th). The heaviest shower of rain was July 14th, at night.

There have been 231 clear days, and 134 on which it has rained, or snowed, or been cloudy and disagreeable.

The coldest weather, at sunrise March 14th—mercury 14°; the warmest, at 3 P. M. August 11th—mercury 96°. The warmest periods were from July 22d to 26th, and August 7th to 12th.

Highest winds, March 2d, April 4th, 5th and 21st, October 1st, and November 7th and 8th.

The latest spring frost was April 14th; the earliest in the fall was October 12th; earliest to do any damage was November 4th.

There have been three sleets and two hailstorms.

Shock of an earthquake, April 24th, at 2.20 P. M.

Range of mercury in thermometer, from 14° to 96°; range of mercury in barometer, from 29.1 to 30.2.

Highest water in Missouri river, during twenty-three years, was April 27th; lowest water of the present year was December 28th.

CORRESPONDING SECRETARY'S REPORT.

The past year, although one of general prosperity to the farming interest of the State, has not been without severe trials to a large portion of our farmers. On our western border, and in the most southern part of the State, the farmers have suffered little from unfavorable circumstances of the season—in fact, their crops were generally unusually good. In the central and eastern part of the State the spring was backward, cold and very wet. Cultivated lands were in many cases badly washed by the rains, and in many instances it was difficult to cultivate the corn crop sufficiently to keep the weeds from outgrowing the corn. The wheat crop, however, was generally good, and the hay crop, I think, universally so. Early in the summer, in the portion of the State last referred to, a drouth commenced which proved of remarkable severity and duration, very materially shortening the already inferior corn crop, and almost ruining, in some places, the crop of late potatoes. It also prevented, throughout the whole State, probably, the sowing of the usual amount of fall wheat, and the thoughts of farmers are now turned to the sowing of spring wheat to make up for the deficiency.

Lesson of the Drouth.—During the protracted drouth of last summer and fall, farmers throughout a large portion of our interior prairie region suffered great inconveniences for want of water both for stock and for domestic purposes. This ought to teach to us to provide against the recurrence of such troubles in the future. On most farms, if all the water falling upon the roofs of buildings were caught in cisterns, a supply would be obtained sufficient for almost any emergency. Moreover, filtered rain water is admitted to be the purest and most wholesome that can be obtained. For household use, one cistern at least should be deep enough to keep the water cool in summer, not less than sixteen feet, and twenty feet deep is better. Such a cistern should be walled up with brick or stone laid in cement mortar. The wells of cities are notoriously unwholesome, so that their use is frequently interdicted during the prevalence of epidemics. This unwholesomeness is due, undoubtedly, to the great amount of filth upon the surface, and which is drained to a great extent through the soil into the wells. The same thing occurs to an objectionable degree, although much less so, with wells in the country. The water in the soil immediately adjoining a well will drain into it, and the water of the soil more distant will follow by a natural law, carrying down into the well more or less unwholesome matter from the surface. It is for this reason that it is better to lay the wall of a cistern in cement, although the sub-soil may be sufficiently retentive to hold water, so that the cistern shall contain no water except what falls upon the roof, or which filters through the brick or stone.

The cistern for family use should be provided with a filter. This may be made by building a four-inch brick wall, laid in cement, across from bottom to top, curving the side receiving the water, which should be of two-thirds the entire capacity of the cistern. The water will filter through the bricks of the partition, and may be drawn pure out of the smallest compartment. Another good method is to dig a small cistern adjoining the large one, about five feet wide by six feet deep, connected, about a foot above the bottom, with the large one by a pipe, and filled two-thirds full of sand and gravel. Into this the water from the roof is discharged, and filters through into the deep cistern. Cisterns of small capacity are frequently well made in clay soil, by cementing on the earth. Artesian wells are rapidly obtained in some localities and afford an abundant supply of water. Ponds may be constructed in most localities which will contain an abundance of water for stock.

Another matter connected with this subject is well worth serious consideration. Every farmer in the prairie region should, as a matter of duty—to guard posterity from the excessive drouths which must certainly follow the denuding of our country of timber—save, as far as possible, all young trees, and begin in earnest the planting of forest trees. If it is not practicable to plant largely at once, make it a point to plant some every spring. In a very few years they will grow to a size to be of important service. Shelter belts along the sides of farms are one of the best institutions which can be introduced into a prairie country. They are very soon appreciated by farm stock as shelter from chilling winds and rain, and must soon ameliorate the severity of our winters and the drouths of our summers. The vast regions opened and opening to the lumber trade of our northern pineries will soon consume their supply, which a few years since was by some considered inexhaustible. A chapter on pine growing will be introduced in another place.

PHENOMENA OF THE DROUTH.—We have learned of several instances where fine springs of water have burst forth during the latter portion of the drouth.

Mr. A. Feudler, who lives near Allenton, St. Louis county, informs us that a spring at the base of a hill near his dwelling has become dry, and a new one has appeared in another locality, further up the hill.

Says the St. Charles Cosmos: "On Travis Murphy's farm, in Dog Prairie, about a month since, in a meadow where there never before had been observed any appearance of a spring, one quite large spring flashed forth, and Mr. Murphy, who had been obliged to bring water from a distance for house and stock, was at once relieved of his labors as water carrier."

"The terrible drouth," says the Washington (Franklin county) Observer of a late date, "continues, to the utter dismay and disgust of our housekeepers and matrons. There is hardly a cistern in town but that is as dry as a bone. The sidewalks and streets are thronged by the busy water carriers, as they pass from their houses to the river and back again, bearing on their shoulders the pure liquid stream (!), freshly (?) drawn from the sparkling waters of the Big Muddy. Our well holds out better this season than it ever was known to, hence we feel quite rich, and smile with proud disdain on the weary water carriers as they file in solemn procession past the door of our sanctum. Will some philosopher explain this phenomenon—that a well, which in ordinary seasons furnishes us with a scant supply of water, should, in this unpropitious time, give more than is needed?"

We find in the Memphis Conservative (Scotland county) the following: "During the drouth a very strange occurrence to us has transpired, which we have not heard satisfactorily accounted for, and which is a subject worthy of the attention of scientific men. Water oozes from the parched and cracked earth—springs gush out at places where they were never before known to exist—and the North Fabius, which usually dried up only in deep holes, in extremely dry weather, now continues to run, and affords more water than it usually does in dry times. Who will furnish us a good reason for these occurrences, for publication?"

Dr. N. M. Harding, of Nevada, Vernon county, Mo., writes (December) that "quite a phenomenon occurred here the other day, for which I am unable to furnish an explanation. Our creeks and lakes had for a long time been dry, or partially so; but all at once, two days before our first fall of rain, water collected in them in considerable quantities—creeks flowed over places that had been dry and currentless for months, and lakes spread out into considerable sheets. The topography around furnishes no hypothesis for explanation. While the country is undulating, it nowhere rises into peculiar elevations. No comprehensive water-shed exists sufficiently near to be used in explanation, yet the creeks received a sudden supply of water—not from the clouds certainly, for rain had not fallen in this whole country for months."

Hon. Wm. M. Beal, of Edina, Knox county, Mo., writes that during the drouth "quite a singular phenomenon occurred in our section. The wells and streams were dried up, so that water became very scarce. The last of October, however, the springs and wells commenced affording more water, and the creeks rose considerably at a time when we had no rains."

Mr. John H. Tice, of St. Louis, makes the following explanation of such phenomena, which is worth considering, though it is presumed it will scarcely be satisfactory to many minds: "In cupping, the partial exhaustion of the atmosphere causes the cup to adhere firmly, and soon blood mixed with water is forced through pores of the skin to fill the partial vacuum. Explorers of the high peaks of the Andes and Himalayas report that at great hights the eyes become bloodshotten, and that blood spurts from the mouth, nose, and ears. The cause of these phenomena is the diminution of atmospheric pressure. In a partial exhaustion of the cup, the surface of the skin under it is relieved from atmospheric pressure to the extent of the exhaustion. The descent of the mercurial column in a barometer on ascending high mountains is caused by the decreasing pressure of the atmosphere at great altitudes. Universal experience is, that before rains the mercurial column also sinks, thus indicating a decreased pressure of the atmosphere. The surface of the earth under the decreased pressure is thus in the same condition that the surface of the skin is under the cup, or that the human body is at great altitudes. Hence there is a similarity in the phenomena that ensue, that water rises to the surface. The phenomenon is not peculiar to drouths, indeed it is then modified greatly, but is observable at all seasons when a change from clear to wet weather occurs. Springs and creeks always then flow more copiously, but the fact is unheeded unless attention is directed to it. In time of drouth, the occurrence of it, though greatly modified, is so remarkable as to attract attention, though few have the curiosity to inquire for the cause of it. There is another phenomenon, the converse of the above, which has often fallen under my observation. During showery weather, when the barometer ranges low, although there is little precipitation, the surface water remains almost constant in amount. Suddenly the weather clears off, the barometer rises, and the surface water disappears. Rapid evaporation will not account for this; it is evidently forced into the earth by increased atmospheric pressure."

Reference to the table of "Season and Crops," which precedes this report, will show many interesting particulars in regard to many localities. It was made up from the reports of correspondents.

On the whole, as before stated, the past year may be considered one of more than usual prosperity among the farmers, and especially a year of great prosperity so far as the great interest of agriculture in the State is concerned. The prices for all food crops have ruled high, and must continue to do so, at least till after another harvest, and probably for several years. On the other hand, the prices of such goods as farmers have to buy have been tending downward, so that farmers have realized unusually good prices for what they had to sell, with a few exceptions, and have bought their supplies chiefly at lower rates than usual.

Again, the immigration to the State the past year, especially during the fall, has been so immense as to make a home market for food crops in many localities at prices greatly in excess of what could have been obtained otherwise.

A condition of things exists, hinted at in the foregoing statement, which is certainly very encouraging to farmers, and which is worthy of more consideration on the part of capitalists and others. This condition has grown out of the war, or is the result of influences brought about by the war. Before the war, agriculture, generally speaking, was barely remunerative. Its products commanded such low rates, compared with the rates for skilled labor, that thousands of young farmers all over the country left their patrimonial homes to embark in manufactures and trade. During the war there was an increased demand for goods of domestic manufacture, and this demand so stimulated production that there is now an excess of such products over the demand for consumption, and hence a depression in domestic manutures and less demand for skilled labor.

Another thing which contributes greatly to causing the present somewhat abnormal condition of high-priced food and depressed manufacturing industry is the enforced popular economy, necessary and judicious, which discriminates in favor of absolute necessaries of life, and against such non-essentials as may be dispensed with without positive injury to health or great sacrifice of comfort. Every article of luxury, whether of home or foreign production, is now at a discount in the market; while articles which give sustenance and strength to the physical man command rates suggestive of famine in the laborer's cottage. While the high food prices continue double and treble the old rates, labor must inevitably command high rates, and all productive enterprises dependent upon it, which do not strictly cater for the most exigent wants of consumption, must continue to languish as at present for want of remunerative prices.

Under this condition of things agriculture presents one of the most profitable and sure fields of enterprise now open to capital and labor. Nearly all the products of agriculture are absolute necessities, and, as prices are sure to rule high for several years, there is no branch of industry which seems to hold out greater inducements. Moreover, the rapid and thorough development of our agriculture is essential to the wealth and prosperity of the State. The wealth of any country depends primarily upon its productions. Money cannot be considered wealth, except so far as it will supply the wants and comforts of life. The elements of wealth consist in the natural resources and productions of the land, developed, changed, and modified by the labor and skill of man, the farmer, mechanic, and miner. Commerce is necessary, but it only transports or changes productions from place to place or land to land. In one sense merchants are only the servants of the farmers, standing as middle men, changing the productions of others, but producing nothing. Without the productions of the soil, trade and commerce would cease. Hence the often repeated, though seldom intelligently acted upon truism, "Agriculture is the basis of prosperity."

That country is wealthiest which possesses most of the elements or materials to work upon, such as good soil, water power, forests of timber, mines of coal, and the different kinds of minerals, quarries of stone, etc. It then only remains for the hand of industry and skill to put these materials into shape, to form real, substantial wealth. All that legislation and capital can do to stimulate production, and aid and encourage the development of our natural resources, will be of the highest importance, and such efforts and expenditures will be sure to meet with rapid and rich returns.

That the condition of our agriculture is now tending rapidly toward improvement, and is really more prosperous and encouraging than ever before, we think there is unmistakable evidence. The total valuation of taxable property in the State in 1860 was $295,552,806. In 1867 the total valuation was $454,863,895, showing an increase of $159,311,089. At the same time the number of polls taxed in the State in 1867 falls short of the number in 1860 nearly 12,000. In a few minor particulars the increased valuation may be attributable to other causes, but mainly it can only be attributed to an improved agricultural condition. The wisdom of general individual effort for agricultural improvement is therefore apparent; and it is equally apparent that it is wise for our Legislature to extend all possible judicious aid to stimulate and encourage this great fundamental interest, the growth and development of which so surely brings wealth to the State, and the better enables us to pay our debts. The only true and sure way of relieving the people of taxation is to encourage production. It is chiefly agricultural production with manufactures that brings wealth, and wealth, of course, makes taxation less onerous. There are numerous ways or particular cases in which expenses may be retrenched without loss to the general prosperity; but to withhold encouragement from productive industry with a view to lessening taxation would be evidently a mistaken policy.

The information received from various sections of the State of the rapid growth of the manufacturing interest, must be regarded as one of the very best signs of our prosperity. The experience of Holland, Great Britain, New England, and Pennsylvania, all proves that the material prosperity of a nation, State, or district is gauged and determined by the remunerative character of its industry, and that mere agricultural production never enriches a people. No nation or community which has confined itself to agriculture has ever realized great wealth. The richness of our soil and the ease with which it is cultivated has probably been a temptation to us to be content with being merely an agricultural people, but there are now indications that in due time we shall rival and finally surpass the East in manufactures.

The importance of cotton, woolen, and miscellaneous other manufactures can scarcely be overestimated. The manufacture of agricultural implements is especially worthy of the attention of capitalists and mechanics. This branch of industry, when conducted by practical men, well acquainted with the wants of the farmers, has uniformly proved successful in the highest degree. Proof of this may be found in the condition of such manufactories in various portions of the West; as, Moline, Rockford, Peoria, etc.

The great prairies of the West present so few obstacles to the use of improved machinery that it is one of the most promising and inviting fields for the manufacture, sale, and use of such machinery.

A company located in our midst, thoroughly acquainted with our wants, will be better prepared for success in the manufacture of implements than any eastern company without this practical knowledge.

The true policy always is to bring the producer and consumer as nearly together as possible, thus saving freights and commissions to middle men. Manufacturing companies located near our important focuses of trade and distribution would have the advantage over eastern companies, as they could sell cheaper and realize greater profits on account of being brought nearer to the consumer of their goods, and nearer to the producer of the raw material for manufacturing and the material for food, while the farmers would sell their products more readily at better prices.

The encouragement of the manufacturing interest of the State is not only a measure of general interest to the whole people, but one of particular interest to any community in which it may be proposed to locate a factory. Such a community would act wisely, and make a profitable investment, by offering to give a good company the grounds and buildings as extensive as might be needed for the business. The investment comes back to the holder of real estate in the increased demand for houses for operation; to the capitalist, in increasing opportunities for safe and profitable investment; to the merchant, in the increased consumption of such goods as he deals in; and to the farmer, in increasing the number of the consumers of the raw material and of food. It would enable the farmer to increase the number and variety of his crops, by making a home market for such crops as will not bear transportation to a distant market. It would thus increase his resources and enable him the better to preserve the fertility of his soil, not only by means of the greater variety of crops, but by the greater ease with which he could return fertilizing material to the soil on account of the consumption of products nearer home. While such interests as have been named are directly affected, every other is affected indirectly. The wealth which is thus collected and mobilized, finds its way into the hands of every citizen, and increases the taxable wealth of the State.

As an instance of what can be done in this direction, we may mention the town of Canton, Ohio. A few years ago, Mr. Ball, having invented an improvement in mowing machines, proposed that the citizens of Canton loan him $10,000 to manufacture them at that place.

They did it, and that one manufactory was the nucleus around which the following have gathered: Two immense agricultural implement manufactories, one of plows exclusively, one of stoves and hollow-ware, one of paper, one of mower knives, one of saddlery and hardware, two of furniture, one of horse rakes, one of farm wagons, one of cultivators, one of wrought-iron bridges, one of soap, besides a large number of other more or less extensive. It must not be supposed that those we have numbered are small concerns—the machine interests alone supporting 2,500 people. The town has trebled in population, quadrupled in wealth, and the people, satisfied by experiment that manufactories can be made successful in the West, are still pushing forward in that direction.

A strong effort will be made to induce Congress to relieve the products of domestic manufactures from internal revenue tax. Such a measure would be of vastly more importance to the West, where manufacturing is less developed, than to the older manufacturing regions of the East, by inducing capital to this important interest.

If the State of Missouri can by any legal means exempt manufacturing establishments, or at least exempt capital, beyond a certain amount, invested in such establishments, from taxation for a period of say ten years, it is believed that more would be accomplished for the permanent wealth of the State than by almost any other means.

It has been truly said, and facts everywhere prove, that no purely agricultural country can become wealthy. It is a serious and deplorable fact that one of the most important needs of the West, especially our own State, is more manufacturing. The tendency of the present condition of things is to the ultimate exhaustion of our soils, and impoverishment, while the manufacturing regions eastward of us are growing wealthy. The New England manufacturer pays, perhaps, a dollar a bushel for western corn, but the western farmer gets scarcely half that sum, the balance going to enrich the merchant and the transportation companies. A bushel of corn may buy a yard of cloth in New England, but the cloth is so increased in value by the time it reaches us that it takes three bushels of our cheaper corn to buy a yard. It is easy to see that this condition of things makes a losing business for us. On the other hand, if we had manufactories in abundance, production would be stimulated, and the wealth of the State vastly increased; because farmers would find a ready home market and better prices for all they could produce, and would purchase their supplies of domestic manufactured goods at cheaper rates.

Our facilities for manufacturing are scarcely surpassed. We have in many localities an abundance of water power, and in others immense beds of coal for steam power. We have soils and climate adapted to the production of a greater variety of the staples, for food and for manufacturing, than any other State. The South and the great West are open to us as a market for any surplus we may produce.

Our advantages for wool growing, it is believed, are unequaled. With our mild and salubrious climate, and abundant pasturage, we can produce wool at less than one-half the cost for which it can be grown in New England. In regard to this important interest, a great advance has been made within the past year. Many thousands of sheep, probably not less than fifty thousand, and perhaps twice that number, have been driven into the State within the latter half of the past year. These flocks have come from Iowa, Wisconsin, Illinois, Indiana, Ohio, and some even from Vermont. A large proportion have come from the State of Illinois. The severe drouth in Central Illinois occasioned a short corn crop, and numerous large flocks were driven from that region into this State, particularly into the mild region of Southwest Missouri. This influx of sheep has enabled our farmers in parts distant from market to sell their corn crop often for double what they could otherwise have obtained. The wool-growers, so far as heard from, are charmed with the Southwest, regarding it as a very paradise for their business.

If the Legislature would now enact a judicious law to protect sheep from dogs, it would afford much encouragement to this important interest. Instances have come to our knowledge of very valuable Vermont sheep being lost by dogs, without any remedy having been obtained. The subject of a dog law has been before our legislatures at every session for many years, showing that there is an urgent and persistent demand for such a law. The time may come when the farmers will make their influence felt by their votes, and politicians who neglect their interests may perchance be left out in the cold. Why not have a farmers' party?

TIMBER—CULTIVATION ON THE PRAIRIES.

We have in another place alluded to the importance of planting timber trees on our prairies, as a protection against the severity of winter cold and against drouth. The importance of commencing this work at once by our prairie farmers can scarcely be overestimated. It will pay in every sense of the word. It greatly beautifies a prairie farm, and thus enhances its value. It enables the prairie farmer to keep his stock better and more cheaply. It takes but a very few years to thus create a home supply of timber for fuel and other useful purposes. Our prairie regions are rapidly filling up with immigrants, and no one can fail to see that in many regions the timber must soon be exhausted, and that some provision must be made for replenishing it. In older States, that were once heavy forests, timber is now becoming scarce. In view of this, we have reason to fear that scarcity will very soon be felt in some of our prairie regions, unless measures are adopted immediately to prevent it.

Few seem to realize how short a time it takes to grow timber trees of sufficient size to be very useful. Those who have made careful observations on this point give the following as about the average growth in twelve years of some of the leading desirable varieties: White maple, one foot in diameter and thirty feet high; ash-leaved maple, one foot in diameter and twenty feet high; white willow, one and a half feet in diameter and forty feet high; yellow willow, one and a half feet in diameter and thirty-five feet high; Lombardy poplar, ten inches in diameter and forty feet high; blue and white ash, ten inches in diameter and twenty-five feet high; black and white walnut, elm, and chestnut about the same; hickory, eight inches in diameter and twenty-five feet high. The different varieties of evergreens make an average growth of twenty inches in hight annually. Many of them will do more than this.

Last fall we visited the farm of Mr. D. C. Scofield, near Elgin, Illinois. Mr. S. located on this farm in 1857, when it was open prairie. Now, he has surrounding his house, occupying a considerable portion of eight or ten acres, a magnificent evergreen forest. Many of these trees are growing in belts or thickets, so thick that it is difficult to get through them, and many of the trees are eight and ten inches in diameter and twenty-five feet in hight. Starting with seedlings a foot high, it is astonishing to witness how much Mr. Scofield has accomplished in timber growing within the short space of ten years.

In regard to the growing of pines and the Tyrolese larch, we give the following from the pen of Mr. Scofield. Most of it was written within the year, for the *American Farmer*, of Rochester, New York:

PINE TIMBER AND ITS CULTIVATION.

Young as our country is, it is old enough to demonstrate the feasibility, the practicability, and utility of planting and producing pine timber for all building purposes, as a part of our farming operations, and though not so immediate in its results in dollars and cents as we may desire, yet by no means less profitable in the end. I know in this fast age, everybody, young and old, from the prattling boy to the tottering old man—*all* are for "realizing" to-day or to-morrow, as the financial term has it, that they may make another "strike."

Now, as to the feasibility of supplying future generations of our country with this most valuable timber. This may be a new thought to many, or if thought of, only to be dismissed as idle, and if accomplished at all, it would be so far in the dark future that the world, which they seem to think will cease to revolve in its orbit when they die, would not be benefited by it. An old lumberman once gravely said to me, and with more truth than fiction, "that the present generation would scarcely pass away before the pine timber in the United States would be about all used up;" and although when he uttered this prediction he was standing in the lumber regions of Northern New York, and had but a narrow conception of the supply of the forests which lie along our northern boundary, and in Her Majesty's dominions on the other side, nor of the demand, which a pineless world spreading southward to the equator, and from the Atlantic to the Rocky Mountains, would produce, yet all this might have laid before him, and he would have come to the same conclusion, that pine lumber was soon to be among the things that were. The same law which produced the forests from which we now obtain our pine still exists, and is as sure in its operations as in all former time. Nearly all we are using has grown from tiny plants since the white man first trod American soil, and many mighty pines that would make boards three feet wide now stand in the older parts of our country, which have grown from plants the size of a cambric needle within the lifetime of some now living. Now He who planted and has held in reserve this great timber belt which skirts our northern boundary, as if to save a supply for man's use when he would be most likely to let it alone till stern necessity compelled, to say nothing of the protection it forms in arresting northern cold, and who arranged the lakes and water-courses by which this supply might be brought to our very doors, still keeps in operation the same law of production, and he who but takes a survey of His works cannot but admire His wisdom and care.

Yet, notwithstanding all these Providential arrangements for our good in these latter days, the same Hand, a long time before the woodman's ax ever swung in this wide wilderness which has now become "the land of the free and home of the brave," caused to grow the useful timber in clusters here and there, nearly all over our entire country, yielding a convenient supply for several generations. Now that is exhausted, and we have long been drawing from more distant pineries. The grave question therefore arises, and well it may,—What shall we do when this is gone? Shall we substitute other timber? But that also is being used up, and already we have to draw largely from the coal beds for fuel. All who have observed the methods of Divine Providence, have seen that a remedy was provided for man only in his helplessness. When God would have a people possess the new world, He covered it with forests of great variety for their use, or in other words planted and brought to maturity a crop for man's supply, not only of convenience, but luxury more valuable than any that have ever succeeded it from all the skill of the husbandman. If we would have new forests we must cultivate and care for them. With unmistakable language, He says to us, "Replenish the earth." To this, we respond, amen! and propose to set about this great work.

That pine timber may be raised from small plants to large trees of two and three feet in diameter within the space of fifty years, in quantities sufficient to supply the wants of the future, is a fact too well demonstrated to admit of doubt or cavil.

The country lying along the Hudson river was settled about the close of the war of the revolution, in 1783, and immediately following, the Dutch having taken possession of the rich bottom lands near its banks many years before. The country westward for many miles contained considerable quantities of pine, which for many years supplied the towns along the river and the city of New York. About 1790, a small pine tree of eight inches diameter was left to grow by a farmer who was clearing his land, the tree standing where it was an ornament rather than incumbrance. It was left to grow till 1815, when it was cut, and measured two and a half feet in diameter; three logs of twelve feet each, and one of ten feet, were taken from it. In the summer of 1854 I stood under a stately pine near the residence of Mr. Dickinson, of Bedford, N. Y. On asking him for a history of the tree, he referred me to his mother, who was standing on the verandah, who said: "In 1813 I was walking in the yard and saw a little bush about two feet high in a leaning position. I stuck a stick by it and tied it upright, and that is the same tree." I measured it, and it was nine feet in circumference two and a half feet above the ground, and seventy feet high.

There is to-day, standing in a yard in the village of Long Ridge, Fairfield county, Ct., a pine tree eighty feet high, three feet in diameter, which was a small tree, not larger than a stovepipe, at the close of the revolutionary war.

These facts speak for themselves. They are accidental demonstrations of the practicability and utility of raising pine forests, any reasoning to the contrary notwithstanding. If it be urged that these were isolated cases, and would not admit of general application, we reply that it comprises a period nearly within a half century in different sections of the country, with nearly the same results. The testimony is valid. I live on and own ground which was bare prairie in 1856, where the plow had never broken the soil. In 1857, I set pine plants one foot high from the grounds of the late William Reed, of Elizabethtown, N. J., some of which are now more than twenty feet in hight, and measure more than one and a half feet in circumference. In 1858 I imported a large quantity of several varieties of pine and spruce, which I set in belts and clusters around and through my grounds, which has literally changed the winter climate of my prairie home from the severity of an open exposure to a quiet forest protection, with a fair prospect that the next generation will enjoy an abundance of pine lumber. Of the different varieties of pine that I cultivate I regard the Weymouth pine the most rapid in growth and hight, and equal to any other in size of trunk. The Scotch pine is remarkably strong and vigorous, and next in value to Weymouth. The prairie soil is well adapted to the growth of pine and spruce, and with the facilities now afforded for obtaining plants, no farmer is excusable who lives in a prairie country for neglecting to plant belts of pine or other evergreens.

I have shown by facts that pine trees grow from very small plants, and within fifty years have bodies three feet in diameter. Now, I propose to show how to raise them.

1. They must be raised from the seeds found in the cones. The plants are as easily grown in most parts of Europe as the apple or maple here; but owing to our hot summer suns the seed bed must be partially shaded, which may be done by nailing common lath to strips of boards six or eight inches wide, and half an inch apart, and placing the frames over the young plants, and only removing them the first summer when they require weeding. They may be bought at very low prices of European nurserymen, and shipped to this country, and till very recently most American nurserymen have obtained a large portion of their evergreen plants from this source. Several varieties, such as the American arbor vitæ (or white cedar), hemlock, spruce, balsam, and white pine, are obtained from the open ground in our forests, and planted with a good degree of success. When obtained of nurserymen, it is better to get those which have been once or twice transplanted.

2. In the removal of evergreen plants or trees great care should be taken to keep the roots from exposure to a dry atmosphere. An exposure of five minutes to a dry wind or hot sun would greatly endanger its life. The plants of deciduous trees have a watery sap, and most varieties will endure considerable exposure, but the resinous sap of all evergreens soon coagulates, and cannot be again restored, and the plant or tree perishes in consequence.

3. The planter should be attended by some one whose business it is to keep the roots of the plants moist, and hand them out as they are to be set. The earth around the roots should be packed with great firmness, and kept clean from weeds, with care to leave the roots undisturbed in the cultivation. It is better to cultivate in nursery rows till two or three feet high, before setting in forest rows. Then plant from ten to twelve feet apart, and give annual culture till they protect themselves from the growth of grass and weeds. April till June is the best season for transplanting.

4. Any variety of evergreens makes good protective belts, yet the American arbor vitæ is best, and may be planted nearer together. Four feet apart will make a complete wind brake, as the limbs will not die on the sides of the tree for many scores of years. No other evergreen will grow so closely, and the limbs and foliage live as this. The Norway spruce-forms a beautiful belt, but must be set eight or ten feet apart, and in two or three rows. And now, in conclusion of these few hints on the growing of pine timber, let me ask every farmer to make an estimate, and see whether he can beautify, protect, and render more comfortable his home, or more profitably invest for the future wants of his family in any other way.

Tyrolese Larch.—The fame of this variety of larch is but little known on this continent, and less appreciated. As a timber for elastic strength it has no equal, and for durability it has no superior, not even in the world-renowned red cedar. For beauty it is not excelled; for rapid growth it has no equal among the whole family of durable and substantial wood. As the best evidence of its superior elastic strength, to say nothing of writers on the comparative qualities of timber, it is asserted that it is used for nearly all the spars of European merchant ships and war vessels, which fact needs no comment.

One of the most intelligent writers on the comparative value of European timber says that, in a row of posts, set in the ground, a part of live oak and a part of Tyrolese larch, the live oak had been rotted away three times and replaced, when it was found there was no visible decay of the larch. The same writer asserts that he knows of a lot of hop poles of this timber that had been used during three generations of men, and were now apparently as sound as when new. The oft-repeated assurances of both Scotch and Englishmen of my acquaintance, whose veracity is unimpeachable, that it was as durable for posts set in the ground, or for any other use, as the red cedar or any known timber, induced me to inquire of Mr. Peter Lawson, of Edinburgh, Scotland, one of the oldest and most reliable foresters of Europe, of its durable qualities, in or out of the ground, as compared with other timber, who replied: "It has no equal, except it be in the red cedar, and I would give the preference to the larch."

The tree is a rapid grower. It is said and confirmed by abundant evidence that the Duke of Athol, in Scotland, planted the seed of the larch from the growth of which he presented to the British government timber with which was built a seventy-four gun frigate, all within his lifetime. The growth of this timber on my grounds, from plants received from Europe in 1857, is testimony in point. Plants not then twelve inches long, nor larger than a straw, now measure twenty-five inches in circumference and from twenty-five to thirty feet in hight.

The tree is rendered beautiful on account of its beautiful foliage, which hangs in graceful tresses from early spring, long before any other tree exhibits leaves, till it ripens late in the fall, and then, like all deciduous trees, sheds its robes and prepares for winter. No country in the world is better adapted to the growth of this tree than our own, and no country would be more enriched by its general cultivation. I have not as yet found any method by which to raise the plants in this country as strong and healthy as those raised in European nurseries. The cheapness of the plants and the facilities now offered for importing them to our country give the preference to foreign plants. Yet we trust the time is not far distant when our practical men will discover a method by which they can produce plants equal in value, and as cheap as foreign nurserymen.

FARM ACCOUNTS.

What farmer would not feel just a little offended if he were told that he did not understand his business? And yet how few farmers do understand their business as other men understand theirs. The merchant knows the cost exactly of all his goods; he knows whether he makes most profit on his sugar or his coffee, his calico or his broadcloth. He knows how much it costs to carry on his business in every particular, and whether, at the end of the year, he has made money, and how much, or lost, and how much. He knows the condition of his business because he keeps accounts.

In the same way the manufacturer knows what it costs to produce his wares, and whether he makes most money by selling in one condition or another. He would do a very hazardous business if he did not keep such systematic accounts as to enable him to know these things. The farmer, without keeping accounts, does a less hazardous business, but, nevertheless, a very unsatisfactory one. How many farmers know what it costs them to produce a ton of hay? or exactly whether hay, oats, wheat, or corn, pays best on an average? or whether it pays best to convert their pastures into beef, or milk, butter and cheese, or mutton or wool? How many farmers know the cost of each bushel of corn they raise, or whether it is most profitable to sell it or feed it to hogs, or how many pounds of pork a bushel of corn will make? A few farmers, and only a few, do know most of these things, because they keep accurate accounts and a record of their operations.

Without such accounts, the business of the farmer is, to a degree, like any other business under the same circumstances, principally guess work. If he will take the same pains, in the same way, to have a knowledge of his business that the merchant or manufacturer does, he may have the satisfaction of knowing results equally well.

When our merchants retire from business they generally choose farming as affording the best means of enjoying a quiet life. They carry with them to the farm the systematic business habits of the counting room. They are generally disposed to apply business principles to their farming operations, and to know, by account-keeping, their expenses and receipts, their profits and their losses. They thus set a good example to farmers, and develop many useful facts, although they may fail for want of experience or desire to make farming profitable. They have shown that book-keeping is as applicable and beneficial, if not as essential, to farming as it is to other occupations.

The reason that farmers do not generally keep full accounts of their business is that they have not been taught it or its importance. If a boy is to be educated for "business," as the term is generally used, it is thought essential that he should learn book-keeping; but if he is to be a farmer, it is not thought of any particular importance to him to know book-keeping. Here is the root of the evil. Book-keeping should be one of the first things taught in all our schools. Every boy, as soon as he can add, subtract, multiply, and divide readily, should be taught book-keeping, as the most important practical application of his knowledge of figures. It is of much more importance to him than to be able to "do" all the "hard sums" in arithmetic or algebra. It will give him an essential part of the foundation for success in the business of life.

Farm accounts should differ in character, materially, from mercantile accounts. They should include an accurate record of all the transactions connected with farming, together with debt and credit kept with every branch of farming. The farmer's accounts should show the profit of each variety of stock kept, of each crop raised, and often of each field. All the labor, seed, and every other expense, should be charged to each crop raised; and, when harvested, credit the crop at the market value, and the balance will show the profit or loss of that crop.

A memorandum should be kept of all such matters as do not properly come under the head of accounts, but are matters of record or facts, as they occur, and might embrace notes of the season, the date of planting and of harvesting, the time of blossoming of fruit trees, time of ripening, etc. A record should be kept of misfortunes and losses, of errors and resolves, whereby the farmer may profit from past experience.

The farmer has to wait so long to reap the fruit of his labor, and is subject to so many vicissitudes and contingencies that there is scarcely any one who can derive so much benefit as he from a careful record of his past experience and observations. There must necessarily be a long process of accounts; but a few minutes spent atthe close of each day in recording the transactions, facts, and observations of the day, will a thousand fold repay the trouble and time so spent.

Among the advantages of keeping more general and systematic farm accounts may be mentioned the following:

It would stimulate farmers to more correct thought in relation to their labors, and lead them to see where their profits could be increased and their expenses lessened.

It would increase the farmer's knowledge of doing business and of keeping accounts, and lead him to systematize his whole business.

It gives him a positive knowledge of his own business, and assists him in keeping out of difficulty with those with whom he has dealings.

It enables him to decide upon those branches of farming which pay the best, so that he may direct his energies accordingly.

By comparison of results and facts for a series of years, it gives him a judgment that amounts to positive knowledge as compared with the "guess work" of others.

By examining his accounts, he is enabled to see where he has spent money that he need not, and where he could have saved money that he did not.

It gives him exactly the knowledge which is absolutely indispensable to enable him to make correct and just returns of his revenue to the United States assessor.

It enables him more readily and correctly to give in a list of his taxable property to the county assessor, and also to make a correct and accurate return of his farm statistics when required.

The importance of obtaining statistics annually has of late years been more and more generally acknowledged. The Congress at its last session established a National Bureau of Statistics in the Treasury Department at Washington. Many of the States had previously established statistical bureaus or enacted laws to provide for the annual collection of statistics. The Legislature of Missouri, at the last session passed a law of this character. It is probable that all the States will soon have similar laws, when the State bureaus, in connection with the National Bureau, will constitute a general system for the annual collection of statistics. It will be impossible to obtain farm statistics correctly unless farmers generally pay more attention to keeping accounts of their business. Comparatively few farmers are prepared to give the necessary facts and items in regard to their farms, and hence, instead of facts, estimates and guessed-at conclusions are obtained. It is plain that an important improvement would be secured by individuals, and to the State, and to the nation, by the adoption among farmers, more generally, of a method of systematic book-keeping.

Now, at the beginning of the year, let farmers resolve to pay more attention to keeping complete accounts of their business. It is a duty that they owe to themselves and to each other. When the facts and actual results of the farmers' occupation become better known, the rights of farmers as a class will be better known and respected.

OSAGE ORANGE HEDGES.

During the past year an unusual degree of interest has been taken in our prairie regions in the planting of hedges. In many instances, if not in most, our farmers have set the plants of Osage orange quite closely, often taking the advice of plant peddlers. In the older prairie regions of Illinois the farmers have had a large experience in the growing of hedges. Some years ago the prevalent idea was to plant quite closely, with a view to forming a thick, impassable hedge. To a considerable extent this idea still prevails, but it is believed that among the best farmers of Illinois, who have given the most attention to the subject, the plan of wide planting and plashing for farm fences meets with most favor. On one Illinois farm, visited last summer, we saw a large amount of hedging. The owner had set his plants the width of his hand apart, and still believed in the plan, though his hedges are now grown and will not turn hogs. We saw hogs find their way through his hedge from the road into his orchard; yet, a line hedge between this man and his neighbor had been plashed and was perfectly proof against hogs or anything else.

The most extensive farmer in Illinois, probably, and the most extensive hedge planter is Mr. Sturtevant. He has been planting miles of hedges the past year at the distance of sixteen inches between the plants, with the intention, when sufficiently grown, of plashing. We think we cannot offer our farmers more sound and practical advice on this subject than is found in the following from the pen of Hon. M. L. Dunlap, of Champaign, Ill.:

It is now something over twenty years since attention was first called to the value of the Osage orange (*maclura*) as a hedge plant. Through all that time, intelligent farmers and planters have not been idle in their efforts to utilize the plant for this purpose.

Without claiming that the best mode of hedge management has been reached, we may safely say that a cheap, efficient, and durable hedge can be made of it. No subject has been more generally written over, or rather under, than this of the Osage hedge; and I will venture to say that no one subject in the whole range of farm economy has been managed with so little regard to good common sense.

The thousands of miles of jagged hedges, that are anything but a pleasure to the owners, as contrasted with other miles of compact, efficient hedges, that add value to the farms they adorn, prove to us that it is not so much that we have yet to learn, as it is to disseminate what we know to the great mass of the people interested.

In the mechanical world, we can please ourselves with forms pleasant to the eye; but, in plant life, we must conform to the laws of nature. When these are well understood, we become masters of the situation, and can proceed at our leisure.

All hedges are fences, but all fences are not hedges; and these again are divided into the ornamental and the useful.

At this time I propose only to treat of the Osage for farm fencing and hedging.

THE SEED.

The seed should be of the previous season's growth, to insure the best stand of plants, though seed half a dozen years old will often germinate in skillful hands. If kept in the oranges through the winter, washed out from the rotten pulp early in the spring, and planted without drying, we may rely upon a good stand of plants.

When the seed is dry it can be treated with an application of hot water, changing the water daily at about 100 degrees and keeping the seed in a warm room. After five or six days the seed can be placed in a shallow vessel, say four or five inches deep, covered with a wet cloth or moss, and to be stirred occasionally to prevent heating; and so soon as the germs begin to appear, plant in seed beds, covered an inch deep, and roll the surface smooth. The best time is at the beginning of corn planting. The soil must be moist, or the seeds that have not started will become dry and fail to germinate until the following spring. These rules are for the farmer who desires to grow his own plants, and not for the commercial plant grower, who sows his one or two hundred bushels of seed.

The seed should not be sown too thick, or the plants will be small. Plants that are from one to three feet high are of the best size for the hedge.

WINTERING.

The plants are taken up in the fall, either with a sharp plow or a spade, tied in small bundles of one or two hundred, with willow bands, and placed in the cellar with layers of earth, or put in pits like potatoes, and covered from frost. At that time they should be sorted in at least three grades, so that each size can be set together. I have often set the third size with success, but it has been by having the hedge row prepared in a very superior manner.

Hedge men tell us that a bushel of seed will make from one hundred to one hundred and fifty thousand plants; but of this I have grave doubts. A farmer who obtains 20,000 plants from half a bushel of seed should be satisfied; nor should he be with less.

THE HEDGE ROW

Should be put in the best possible condition, for upon this depends the value of the hedge. A border ten feet wide should be plowed—first outward, so as to leave a dead furrow where the hedge row is to stand, then at least two plowings to the centre, so that it will be slightly ridged, making a deep, mellow bed in the centre. Now harrow thoroughly, and roll.

This will leave the land in good tilth, and with a smooth, even surface. It is now ready for the plants. Stretch a line where the hedge is to stand; cut the tops from the plants to within two or three inches of the ground, which will leave the plant about eight inches long, the root being six inches. The best tool to set with is a round-pointed steel dibble; with this make a hole, set in the plant with the left hand, and then thrust in the dibble near to the plant and press the earth to it. A good hand will set 3,000 to 4,000 plants in a day, in this way. Some use a spade, and others a sharp stick, but the dibble will save its cost in setting a mile of hedge, over any other tool, and leave the plants in the best condition.

I have discarded all flat trowels and dibbles in setting plants either in garden or nursery. I have them made of different sizes. Those for the Osage are over a foot long, and at the thickest part one and a half inches in diameter. The shank, or socket, is made like a chisel, into which is put a wooden handle, with a cross piece for the hand; or an old spade handle will answer the purpose, but it is rather clumsy.

One foot apart is probably the best distance, and the one that I now set them. I formerly set four to six inches, but find it does not make so good a hedge.

CULTURE.

The first summer the plants must have good culture. A sulky plow, or the double shovel, should be freely used, so as to give a good growth. Keep all weeds down, and when the growth is arrested in the fall, turn a heavy furrow against both sides of the hedge, to prevent heaving out or winter killing by water settling about the plant. The second year they will require good culture. In all this time they are not to be cut or trimmed in the least, and, if they have made a good growth, will be four to six feet high, presenting a smooth, even appearance.

THE HEDGE.

Now comes the making of the hedge. The third spring, the plants can be cut a trifle more than half off near the ground, and bent down in the direction of the hedge. They should be pressed down as close as possible to the ground. They are left to grow up from these now prostrate plants, and will be so thoroughly matted together that nothing can get through them.

THE SHEARS.

By July you can begin to use the shears, and after that once or twice a year, to your taste. The fourth spring your hedge is ready for use.

Another mode of plashing is to leave every fourth plant standing, cut it off three feet above ground, and trim off the side shoots. Trim the other plants to a single stem, cut at the bottom as before directed, and weave in between the upright plants. This will make a nice hedge for gardens and yards, and is very firm, tight, and strong.

AN OSAGE FENCE

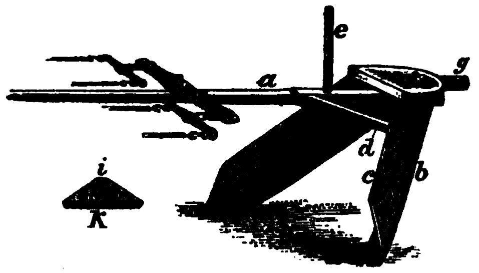
Is simply the two-year old hedge left to itself, without cutting back. This will make a good shelter, will turn all stock except hogs, and on the open prairie is often desirable.

I do not pretend to say that hedges cannot be made by pursuing a different course, but do say that they can be made in four years from the seed so strong that no domestic animal will go through them. I have seen hedges turned out by the first of September, the third season after having been set out. The great drawback has been in cutting the hedge too young. It must first become a hedge; after which it is to be kept within proper bounds. With a thorough preparation of the soil and good plants, there need be few if any failures, and if there should, the faults can be remedied at the time of plashing, by making a layer of a branch of the next plant.

A few days since I passed the premises of a prominent hedge-plant grower, and saw his hedges full of hog holes, made by the village swine. This was one of the hedges made by repeated cuttings, instead of plashing. All the English Hawthorn hedges are made by plashing, and we must adopt the system with the Osage. *Grow your hedge before you trim it.*—M. L. Dunlap.

SWEET POTATO RIDGER.

To farm with profit and pleasure, we must do all the work we possibly can by machinery; and I believe making the ridges for sweet potatoes has not generally been done by any machine made specially for the purpose, nor in the best and most expeditious manner possible. Having felt the need of such a machine, I last year went to work and got up one, of which this cut is a representation; and I was so well pleased with it, and all those who saw the work thought so well of it, that they wanted one; so I thought I would be doing the reading farmers a favor by giving a description of it.



The machine was made mostly of wood; *a*, a pole 12 feet 6 inches long, about 5 inches at the thick end, where the moldboards are fastened to it. To the under side is fastened a piece of oak (*h*) 2 or 3 inches thick, 2 inches wide at the hind end (*i*), 16 inches from point to point at front end (*k*), and 7 inches wide from hind to front part (*i* to *k*); this piece has to be properly beveled, to make the moldboards (*b*) to stand forward at the proper angle; it is nailed to the under side of the pole, and the moldboards (*b*) are nailed to it. They—the moldboards—are of 2-inch plank, 3 feet 6 inches long and 7 inches wide, and are 2 feet 10 inches apart at rear end at bottom. To those are fastened two other boards (*cc*), which are something like a coulter. They prevent the earth from falling over the moldboards (*b*). They are set on so as to be straight with the line of draft on the outside. The braces (*d*) are put on and fastened to the pole and main moldboard (*b*) before *c* is fastened; *e* is a 2-inch stick fastened to the pole near its hind end, by which to guide the machine; *f*, the seat for the driver; *g*, projection by which to lift the machine in turning. The moldboard (*b*) should be shod with a steel share inside; I cut an old spade in two, and it answered the purpose very well.

Now, having made the machine, a few words as to how to work it. The ground should be free from stumps, well prepared as can be by the use of plow, harrow, and clod-crusher. With a plow mark off the ridges; I used a side-hill plow, so that with each furrow I laid off a ridge; with common plow, on level land, the same may be done by starting at two places some distance apart, laying off a ridge on one bed coming, and another ridge on another bed going. Having laid them off, you are ready to go to work with the ridger. Have two stout, steady horses hitched to it; then let both horses walk in the furrow on each side of the ridge. When the machine is in position the driver sits on the seat *f*, while another man walks alongside and steadies the machine, by holding on to the stick *e*. Once going over the ridge will usually make a pretty good ridge; but by going over twice you make a better and neater ridge than can be made by any other method.

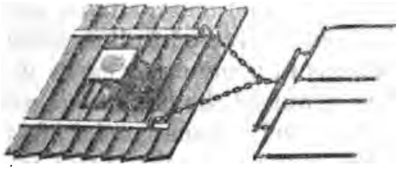
The moldboards take up the earth, which slides up the inclined plane of the moldboards, and falls down between them on the plowed-up ground. They also press the earth enough to prevent its drying and crumbling down in dry weather. I have also attached a roller (not shown) behind, under the seat and projection *g*—a roller 6 inches in diameter, which smoothes off the top of the ridge, and leaves it in fine shape for planting.

This machine I have described as I have built it, out of wood. It would, however, be better if moldboards were made of steel. It could also be hung on wheels like a gang-plow, and then would only need one man to operate it. If some implement manufacturer would make them, I think there would be good sale for them. At least a dozen parties have expressed themselves to me as wanting one. This machine is not patented, and any one has the right to make it.

It may not be out of place to say a few words about planting. I make my holes with a triple dibble, that is, I fasten three dibbles into a piece of wood 2 inches thick, 3 wide and 30 long, having the middle one run through some two and a half feet, so as to make a handle; the dibbles are 13 inches apart, the distance that I plant apart. With this dibble a man makes three holes at once, and all the same depth; another man drops the plants, while another follows him and puts in the plants, and, with one blow or pressure of the fist, presses the earth firmly about the roots. I never water, even in the dryest weather; but always wet the roots before planting. Wet all plants as soon as they are taken out of the earth, and plant wet; and do not water after planted, and you will have no trouble in making them grow.—E. A. RIEHL.

NOTE.—Since the accompanying cut and description were made, I have built a new machine and made it somewhat different, and it works much better. The coulters (*cc*) are made of thin plow steel, and the moldboards (*bb*) are faced with it, thus presenting a smooth surface, all steel to the earth, and it scours nearly as good as a plow. The stick (*e*), seat (*f*), and projection (*g*) are also dispensed with, and in place of them I have put on a pair of short plow handles, which work much better than the former plan; and though I do not consider the machine perfect, yet I think it is as valuable to me as any other implement I have on my place. E. A. R.

CUMBERLAND CLOD CRUSHER.



To grow good crops we must prepare our soil in a thorough manner, plowing deep, and thoroughly breaking all lumps, for which latter operation there is no better implement than the Cumberland Clod Crusher—so simple in construction that any person that can handle a saw and hatchet can make one; and as the season is near at hand when it will be wanted, I will describe it: Get two oak sticks, two and a half by three, or three inch square, three and a half feet long; lay them on the ground, three feet apart; next take a strip, two by two, and five feet long, spike this across the two pieces on the ends, so that about ten inches will project on either side, then four two-inch plank (oak is best) eight inches wide and five feet long, spiking them on like clapboarding; then another plank fourteen inches wide and five feet long; you will then have the crusher complete (upside down) except a chain to be fastened to the two top pieces, to which the planks are nailed for the horses to pull by, and a movable seat, to be used when the weight of the crusher is insufficient, when the driver can ride.

(By mistake of the engraver, the cut shows two more planks than are required.)

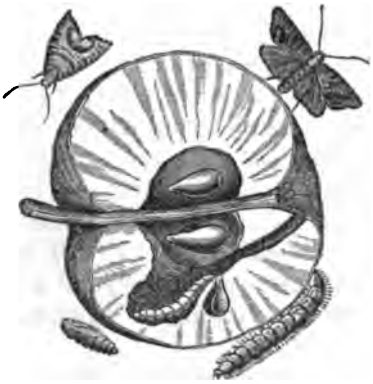
Make one and try it, my farmer friends. I have used one, and can assure you that it is better than any patent harrow or roller I ever saw. It grinds the clods to powder, levels up holes, and leaves the ground as smooth as a floor. I would not be without it for five times its cost.—E. A. RIEHL.

THE APPLE-WORM AND THE APPLE-MAGGOT.

[Copied by permission from the American Journal of Horticulture.]

Carpocapsa pomonella (Linnæus); *Trypeta pomonella* (new species).

These are two very destructive larvæ, which burrow into the flesh of the apple, so as to render it not only unsightly, but absolutely distasteful. The first of these, the apple-worm, was originally, like almost all our worst insect foes, imported from Europe; though it has gradually spread westward, till it now infests nearly the whole northern half of the Valley of the Mississippi. The second larva, the apple-maggot, is a native-American species, and breeds naturally in our wild haws and crabs, but, within the last few years, has been noticed to attack the cultivated apple in Massachusetts, in Connecticut, in New York, and probably in Vermont also. What is very remarkable, although the very same species exists, to my personal knowledge, in Illinois (for I bred it myself there many years ago from haws, or thorn-apples, as they are sometimes called), yet it has not, as yet, been ascertained to attack cultivated fruit anywhere in the West. It would seem as if, in this as in many other cases, it is only a local race of the species that has acquired the habit of attacking tame and imported instead of wild and indigenous species of plants; and that this race transmits to its descendants, by the law of inheritance, the peculiar habits which it has itself incidentally acquired. Thus the habit of pointing game in the field, which is clearly an acquired and not a natural habit, is often transmitted by inheritance to young pointer puppies, without any artificial breaking or training whatever. On no other supposition than the above does it seem possible to account for the fact that the very same species of insects exists both in the East and in the West, and yet attacks the cultivated apple only in a certain limited region, even in the East; for, according to Dr. Trimble, "this new and formidable enemy of the apple is found in the Hudson-river country, but has not yet reached New Jersey."*



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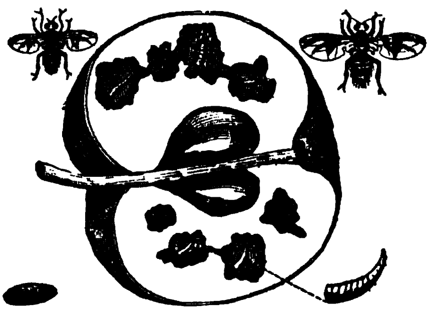
*New York Semi-weekly Tribune, July 19, 1867.

If these views be correct, we may anticipate that the apple-maggot will gradually spread westward, till, in some twenty or thirty years' time, it becomes as great a pest in the Valley of the Mississippi as it now is in New England and New York.

The annexed figure exhibits an apple which has been excavated and preyed on by the common apple-worm, or larva, of the codling-moth (*Carpocapsa pomonella*). On the right hand below is seen one of these larvæ full grown, and placed in such a position as to show to the eye at once that it has sixteen legs; namely, six true or jointed legs in front, and ten sham legs or "prolegs" behind. On the left hand below is the pupa, or chrysalis, of the same insect; and above will be seen the perfect-winged moth, the right-hand specimen with its wings expanded for flight, the left-hand one with its wings closed.

Now look at the following drawings of the apple-maggot in all its stages, where the larva, pupa, and perfect-winged state of this insect are represented in corresponding positions—all, except the left-hand specimen above, being considerably magnified—and it will be seen at a glance that the apple-worm is an entirely different insect from the apple-maggot. The first is a sixteen-legged worm, or "caterpillar," as entomologists would call it; the second is a legless maggot. The first produces a four-winged moth, or "miller," belonging to the order *Lepidoptera*, which includes the butterflies, the hawk-moths or humming-bird moths, and the vast host of the true moths; the second produces a two-winged fly belonging to the order *Diptera*, which comprises all kinds of musquitoes, gnats, gallinippers or daddylonglegs house-flies, horse-flies, bot-flies, etc. Even the pupæ of these two insects are entirely distinct; for that of the first shows the wings of the future moth, soldered indeed to the side of the body, but still plainly visible; while that of the second is what is technically termed a "coarctate" pupa—that is to say, instead of the larva moulting its skin to assume the pupa state, the larval skin is retained whole and unbroken, although greatly contracted in length by the pupa, so that the true pupa can only be seen by dissecting away the shrunken skin of the larva. The little elongate-oval, mahogany-brown bodies that we often see in cheeses infested by the common cheese-fly (*Piophila casei*), afford a familiar example of this peculiar kind of pupa;



and any one may easily satisfy himself that they are really the pupæ of the cheese-fly by inclosing a few of them for a few days in a vial till the perfect fly comes out of them.

But not only is the apple-worm structurally distinct from the apple-maggot, but the habits of the two insects differ remarkably. The former comes out of the pupa in the perfect or winged state quite early in the summer, or about as soon as the young apples are the size of hazle nuts; the latter does not come out till the middle and latter end of July. Hence apple-worms are commonly met with in June, but apple-maggots never till August and September. Again, in one and the same year, there are two successive broods of the apple-worm moth; the first coming out in June from pupæ which have lived in that state through the winter, and the second coming out about the latter part of July from larvæ generated in June by the first brood. On the contrary, in one and the same year, there is but one brood of apple-maggots, which is generated by the flies that come out in July, and never transforms into the fly-state the same season. Furthermore, the apple-worm spins a slight silken cocoon above ground; while the apple-maggot spins no cocoon at all, and burrows underground to pass into the pupa state, remaining under the surface of the earth, without eating anything all through the winter and until the middle of the following summer. Even the modes in which the two larvæ operate upon the infested fruit differ somewhat; for the apple-worm burrows chiefly in the core of the apple, though it often attacks the external flesh as well, while the apple-maggot, so far as I can find out, never attacks the core, and burrows exclusively in the external flesh, forming there brown, discolored, irregular excavations about the size of a pea, and often running one into another.

In the winter of 1866-7, I received specimens of the apple-maggot, some in the larva and some in the pupa state; first, from the editor of "The Circular" of the Oneida Community, published at Wallingford, Connecticut; second, from Mr. Isaac Hicks, of Long Island, New York; and, third, from Mr. W. C. Fish, East Falmouth, Massachusetts. They were all placed in moist sand; and they all, in July, 1867, produced the same fly which has been figured above. The following account of the operations of the larva is copied from "The Circular" of November 12, 1866:—

"Two months ago, we were congratulating ourselves on a fair crop of winter apples. To all appearance, they were freer from worms than we had known them in this section for years. But, alas! our hopes are again blasted. Although the *apple-worm* (the larva of the codling-moth, *Carpocapsa pomonella*) is not so numerous as in some seasons, the *apple-maggot* seems to be as prolific as ever. Two weeks ago we overhauled two hundred and fifty bushels of apples that we had gathered and placed in store for winter use; and of that number we threw out fifty bushels, most of which had been rendered worthless, except for cider or hogs, by one or the other of the above-named insects; and still the work of destruction goes on. The apple-worm, by this time, has ceased his work, or nearly so; but the depredations of the apple-maggot continue up to the present time, converting the pulp of the apple into a mere honeycomb, and rendering another overhauling soon indispensable."

In December, 1866, Mr. Fish wrote to me as follows of the apple-maggot:—

"This insect is very numerous in this section of the country, being much more abundant in the thin-skinned summer and fall apples than in the later varieties. It seems to increase every year. Within a few rods of the house in which I am writing, stand five or six trees of the old-fashioned variety called high-top or summer sweets. On these trees the crop of apples is annually rendered worthless by this insect, which tunnels the fruit in all directions. Apples which, when taken from the tree, appeared sound, would, in the course of a few weeks, as soon as they became mellow, be found to be alive with these pests, sometimes to the number of six or more in each apple, although not commonly as many as that. I have found that, in most cases, the fruit had been previously perforated by the larva of the apple-worm moth (*Carpocapsa pomonella*) before becoming inhabited by this insect."

It is probably of this same apple-maggot that Mr. Calvin Ward, of Vermont speaks, as "boring his apples in all directions, and doing more injury to him than all other insects combined; having, in 1865, injured his apples to the extent of one-half their value, but in 1866 not having been so bad as in the preceding year."* Having, however, failed to receive any specimens from this gentleman, I cannot be certain of the fact; but that the true, genuine apple-maggot infests Massachusetts, Connecticut, and New York, I have the best possible evidence in the reception of the insect itself from those three States.

This apple-maggot fly must be carefully distinguished from another two-winged fly, which has been described by Dr. Fitch as the apple-midge (*Molobrus mali*), and the larva of which, according to that author, operates upon the pulp of apples much in the same manner as our insect. Instead of being in anywise related to each other, these two species actually belong to different subdivisions of the great order of two-winged flies (*Diptera*); the apple-midge appertaining to the group which has a pupa of the ordinary structure, and the apple-maggot to that which has the so-called "coarctate" pupa.

I know of no available means to check the depredations of this little pest but catching and destroying the winged flies that lay the eggs from which there afterward hatch out the minute maggots that eventually burrow unto the pulp of the apple. Luckily for the fruit-grower, the fly itself is marked in so very conspicuous and peculiar a manner that it can be readily recognized by any one who has seen the figures given above; and, as already stated, it may be expected to make its first appearance about the middle of July. About this time, therefore, it would be well to keep a careful lookout for it.

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* See the "Answer" to Mr. Ward in the Practical Entomologist, vol. ii. pp. 20, 21. Mr. Ward's larva may possibly be that of Dr. Fitch's apple-midge, which will be subsequently referred to in the text.

It only remains, as this appears to be a species hitherto unknown to science, to give a brief description of it in a footnote, so that, for the future, it may be scientifically recognizable. Of the genus *Trypeta*, there are forty-two described species found in North America;* and from all of these it differs essentially, though it comes pretty near to the *Trypeta cingulata* of Low. I may add, that Baron Osten Sachen, to whom I have forwarded a specimen, agrees with me in referring the species to the genus *Trypeta*.†—BENJAMIN D. WALSH.

THE MANTIS RELIGIOSA, OR PREYING MANTIS.

This singular insect is very abundant in this region, and is perhaps generally best known here under the name of rear-horse. It takes its name from the attitude which it assumes when watching for its prey, the thorax being raised and the two fore legs held up together, like a pair of arms, ready to seize any insect that comes within its reach. It is extremely voracious, and destroys innumerable insects, which it catches between the sharp spines of its fore-legs, and, by suddenly closing the joint of the leg, impales them, and then devours them alive.

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* See Low's Dipt., N. A., pp. 64–102.

† TRYPETA POMONELLA, new species.—*Head* rust-red; eyes and all the bristles black; front edge of the face and hind orbit of the eye more or less tinged with white. *Thorax* shining black; a humeral fillet, and all but the extreme base of the scutel, white; on each side of the thorax, above a gray fillet, opaque, with short, dense, gray pubescence. *Abdomen* black, pubescent; top edge of the four basel segments white above—beneath, except the tip and a more or less distinct medial fillet, dull rust-red; oviduct short. *Legs* pale rust-red; four hind thighs, except the knees, black; tips of the four hind tarsi, and sometimes the front thighs, tinged with dusky. *Wings* whitish-glassy, banded with dusky, somewhat in the form of the letters IF,—the I placed next the base of the wing, and its lower end uniting rather indistinctly with the lower end of the F; the base and extreme tip of the wing being always glassy. Length of body, from fifteen to twenty hundreths of an inch; expanse of wings, from thirty to forty-three hundreths of an inch. Six males bred from apple July 15 to 23; two males and one female bred from haws July 23 to 28.

THE LARVA is of a greenish-white color, from fifteen to twenty hundreths of an inch long, and about four and a half times as long as wide, cylindrical behind, with the tail-end squarely docked, tapering in front from the middle of the body to the head. Head pointed, but narrowly emarginate in front; its inferior surface with two slender bluntish coal-black hooks, projecting in front when the mouth is protruded, at the base of which there is a smaller pair connected with the base of the others like the antlers on a stag's horn. At the base of the first segment, behind the head, a dorso-lateral, transverse, pale-brown, flattish, rough tubercle. Last segment below with two pale-brown, horny, rough tubercles, each composed of three minute thorns longitudinally arranged, and above with two whitish retractile ones, each pair of tubercles transversely arranged.

THE PUPA scarcely differs from the larva except in being of a pale yellowish-brown color, and contracted in length so as to approximate to an oval form, and be only two and a half instead of four and a half times as long as wide.

Mr. Townsend Glover says: "Its voracity is such that the females, which measure sometimes two inches and a half in length, and are larger and stronger than the males, devour their mates when they happen to fall in their way in an unpropitious time."

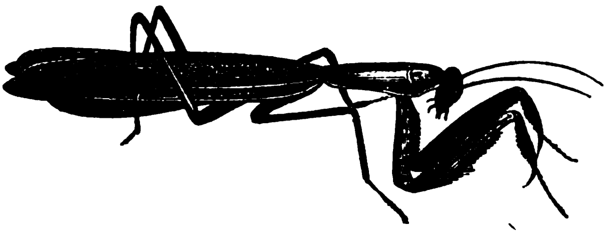
The female lays a mass of eggs on the branches of trees, very frequently on trunks of small fruit trees, and sometimes on the fence.

[*Eggs of the Mantis.*]

This cut is a very correct representation of the mass of eggs. If deposited upon a small limb or twig, the shape will be longer and narrower. From each of these bunches will be hatched out a large number, probably a hundred or more, of these insects.

"The young are hatched in June, and appear like the perfect insect in shape, except being wingless, and are destructive to the other insect tribes, as I have seen them devouring the aphis with great relish when not more than three days old. It is only in the last stage that they acquire wings, and are able to fly from tree to tree in search of other insects. When at rest, the perfect insect stands on its four hindmost legs, keeping its thorax elevated, with the fore-feet closed, and continually moving the head slowly in a whimsical manner, when watching the motions of any person who happens to disturb its repose. The gait, in general, is a leisurely walk, but when disturbed it can jump with considerable agility.

"The rear-horse may be made tame and familiar with mankind. I knew a lady who had one of them in her room that in a short time became so bold as to come to her when she approached, in order to be fed with flies or small pieces of raw meat, which it readily took from her hand. All the spines of the fore-feet are immovable except the middle one of the second joint, which is also longer than the rest." —*Glover.*



[*Mantis Religiosa.*]

Hooker says: "If two are kept together without food, they fight until one is killed, and the victor destroys his adversary. Fights between these insects are among the sports of the Chinese, the pleasure being the same as that which is derived from cock-fights and bull-fights."

Hundreds of farmers, every year, pull off the bunch of eggs of the mantis from their trees and destroy them, under the impression that they are the eggs of some injurious insect, while in truth few insects are of more value to us than this. We have sometimes carried the eggs from the orchard to house, hatched them and had the garden and shrubbery well stocked with these voracious and odd insects, and found them very serviceable in keeping the rose-bushes, grape-vines, etc., free from insect depredations.

REPORT OF THE COMMITTEE ON ENTOMOLOGY.

(From the Illinois State Horticultural Transactions for 1867.)

Having learned that my co-workers in the other sections of the State will have no report, and feeling that the committee on this subject should be represented, I have hurriedly drawn up this review, which is as brief as my time was limited.

In looking over the entomological reports in the transactions of the State Agricultural Society, I find that much space was there occupied in giving an outline of the study of Entomology, and of the classification of insects; presuming, however, that there is no one member of this society but knows full well what an insect is, I deem it unnecessary to occupy time in that manner, or in dwelling at all on the study of insects as a science, since any tyro in the matter could take Westwood or a half dozen other works devoted to these subjects, and make a voluminous, but tedious and uninteresting report. Neither do I presume that you wish re-statements of facts which may at any time be ascertained by referring to such standard works as those of Harris and Fitch; but take it rather that you wish recent observations on those insects which more particularly interest you as horticulturists, and which have attracted especial attention during the past season.

With this short prelude, I will state that we have had, this year, a remarkable instance of the wonderful influence weather sometimes has on insect life. One of the most noticeable features of the spring was the great abundance of the common apple tree plant louse (*Aphis mali*). Even in mid-winter I received twigs covered with their little black eggs, and in early May both the eggs and newly hatched lice were received; while from all quarters they were heard of in abundance, and threatened to do great damage. Now by June they were scarcely heard of, and I could find none on the trees which a few weeks before had been covered with them. It was manifestly too early for their numerous enemies to have worked such a change, and I attribute it entirely to some unusually cold frosty nights which occurred soon after they had hatched; for, just as the fruit bud will stand the test of winter when shielded by its compact varnished covering, and yet get nipped by a slight frost when once it has disclosed itself, so the plant louse will bear any extreme of cold in the egg state, but when once it leaves this tiny black shield, the slightest frost affects it.

THE COLORADO POTATO BEETLE. (*Doryphora 10-lineata*, Say.)

In the entomological events of the year this insect holds a conspicuous place. I first described and recorded its transformations in 1863, since which time, in our different agricultural periodicals, full numerous accounts of it have been given. Contrary to the general law, believed in by many, that plants and animals always travel and spread in a westerly direction, this insect has, since 1859, been marching eastward from the Rocky mountains, where it had doubtless flourished for centuries, and where it would no doubt have remained, had not civilized man, by interrupting the natural harmony of things there existing, induced it to leave the scattering plants of wild Solanum—its original food plant—that it might revel and multiply in broad acres of cultivated potatoes, which it found greatly to its taste, but which, without man, it had probably never tasted.

Much difficulty has arisen among writers on this insect, and the time of its appearance in a particular neighborhood is with difficulty ascertained, on account of another species of the same genus, which is very similarly marked, and which was described by Germar in 1824 by the name of *Doryphora juncta*. Fitch, in his ninth report, confounds the two, stating that Germar's *D. juncta* is but a synonym of *D. 10-lineata*, and there is little doubt but that much of the dispute between certain editors has had its source in want of a proper knowledge of the habits of the former.

In 1861, Mr. Charles Sonne, of Chicago, while beating on hickory bushes, captured specimens of this beetle, and doubtless on this fact alone the hickory is believed to be its food plant; consequently any insect hitherto reported as feeding on the potato, and bearing a general resemblance to either, was invariably referred to *D. 10-lineata.*

Now there is good reason to believe that the one will feed on the potato as well as the other, for Mr. Sonne is not positive that the beetles captured by him were feeding on the hickory; while Mr. Isaac A. Pool, of Chicago, who was with him at the time mentioned, informs me that they had merely congregated there for shelter, there being a potato patch within a few yards, and it being rainy at the time; while in the summer of 1864 I found this *D. juncta*, in conjunction with its larvæ, feeding upon a species of Solanum (probably the *nig-*

rum) near Columbus, Kentucky,* and you all know how closely these plants are allied. Indeed, by many authors the two beetles are looked upon but as varieties of the same species. The larva of the Colorado beetle (*D.* 10-*lineata*) is of a reddish-brown or Venetian red color, while that of *D. juncta*, though of exactly the same form and somewhat similarly marked, is white, inclining to cream color, having the usual vesicular bluish, dorsal shades. Now Fitch (N. Y. Rep., IX, p. 232) describes the larva of *D.* 10-*lineata* as being a pale yellow, and as he confounded the two beetles, it is barely possible that some of the larvæ which he received from persons who found them upon their potatoes may have been those of *D. juncta*. This beetle, though resembling so closely the true potato insect, is readily distinguished by its having the space between the second and third stripes, counting from the outside, of a reddish brown, in contrast with the yellow ground color of the wing-case, and by these two stripes being always united behind; whereas, in *D.*10-*lineata* the third and fourth are joined, the space between them being of the same color with the rest of the wing-case. If, as I suppose, the *D. juncta* will feed upon the potato, the reason that it does not multiply so prodigiously as its confrere is probably because it is constitutionally more delicate, though we cannot always arrive at the why and wherefore of things.

During the past summer, according to reports received, the Colorado beetle has already invaded limited portions of Indiana, and has occurred in most of our northern and middle counties. I saw it in those of Iroquois and Kankakee for the first time. There is a very general impression that this insect is poisonous, and from all I can learn it is not without foundation, as under certain circumstances the ill effects of handling them have been apparent. There is no better preventive than heavy mulching and killing the beetles which appear early in the spring. I am satisfied that by united effort this pest might be almost entirely stayed in a single year. The beetle winters over in the ground, and is roused to activity as soon as potatoes show signs of green; therefore, by going over the field regularly each day at this season, the few that are destined to give birth to the immense armies which invade our fields during summer may be readily killed. I am just as thoroughly convinced, however, that it never will be checked in this manner, since the time when the whole farming community may work in unison on any point is not yet arrived. It will, therefore, take its course as other insects have done before it. No doubt the balance in nature will be eventually regained, and this beetle will soon meet with enemies enough to keep it in due check. It is at present not confined to the potato, tomato, and egg-plant, but has been found feeding with equal relish on various flowers, among

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*Since the above was written, I have ascertained from Mr. Townsend Glover, of Washington, D. C., that he has himself taken the larva of *D. juncta*, feeding upon the *Solanum carolinenis*, or horse-nettle, in Georgia, and a Mr. Walter has found it feeding on the egg-plant (*Solanum meoglena*) in Montgomery, Alabama.

others the dahlia and aster. Thus it bids fair to acquire a polyphagous nature.

BLISTERING BEETLES. (*Cantharidæ.*)

I learn that the Colorado beetle has been exceedingly numerous in the vicinity of Alton, and Mr. Phil. Springer informs me that it has occurred in great numbers around Springfield; but our southern counties are exempt from it, compared to those of the north. The old-fashioned potato-beetle, *Lytta vittata*, however, is far more injurious with our southern friends than with us. Like the Colorado beetle, it is striped with black and yellow, but is easily distinguished by its more elongate form. I have found whole acres greatly injured by this insect, one patch especially, belonging to Mr. Theo. Goodrich, of Union county, being entirely ruined. The mulching remedy would avail but little with this blistering beetle, as the larva lives and develops underground, subsisting on the roots of different plants. Besides this species, two others, the *Lytta cinerea* and *atrata*, are found on potato vines, but not in such considerable numbers; while a fourth species, the *Lytta ænea* of Say, attracted considerable attention in Union county last April, by stripping young fruit trees entirely of their blossoms. Mr. T. M. Tracy, of South Pass (Practical Entomologist II. p. 97), states that though they will nibble at the young fruit and leaves, they under no circumstances touch the stamens; and Mr. Goodrich, on whose pear trees they were especially numerous, informed me of the same facts. The curculio-catcher was used to good advantage with them, as a slight jar causes them to fall. In the heat of the day, however, they very soon take wing again, while in the cool of the morning they are more dull.

FLEA-BEETLES. (*Halticidæ.*)

Again, in the southern portions of the State more especially, I have found whole fields of potatoes looking seared and yellow, with their leaves, upon closer examination, riddled with small round holes, as though made by different sized shot. At first the immediate cause of this riddled appearance is not easily discerned, but sweep a few vines with a bag-net, and lo! it soon swarms with myriads of little black, active, jumping beetles, which put you in mind of fleas, and which, on account of this resemblance, are known as flea-beetles. The species under consideration is known as *Haltica pubescens*—Illiger, and is found on the cucumber and many other succulent plants besides the potato. It is of a black color, with clay-yellow antennæ, and rows of punctures on the wing-cases. Length 0.08. The larvæ of these small flea-beetles may be found feeding upon the substance under the skin of the leaves.

TORTOISE BEETLES. (*Cassididæ.*)

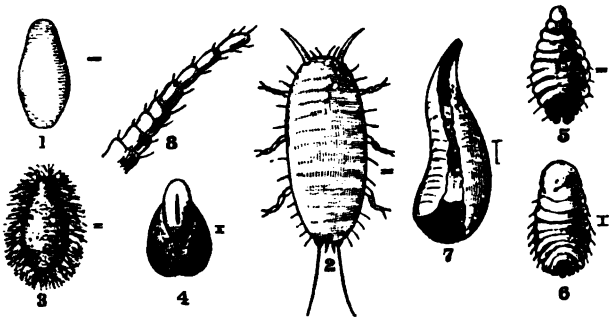
On account of the serious injuries caused by the Colorado potato beetle, it has been recommended in many of our agricultural journals to plant the sweet potato instead. In the southern portion of the State this vegetable is already cultivated to a considerable extent, but it suffers from a class of insects known as tortoise beetles, almost if not quite as badly as does the Irish potato from *its* foes. I don't think Dr. Farrell, of Union county, will have a sweet potato worthy the name, on account of them. I have found four species attacking this plant: *Cassida bivittata*, Say, a striped yellow and black species; *Deloyala purpurata*, a black species, with more or less gold upon it; *Cassida pallida*, Say, a yellow or golden species, and *Cassida aurichalcea*, Fabricius, also golden, but with a small dark spot on each wing-cover. These insects eat the potato leaves both in the larval and beetle states. As larvæ they are armed at the sides with prickles, and look very much like a turtle, from a side view. They are generally characterized also by covering themselves by their own excrement, which they hold over the back by aid of two filaments projecting from the tail. The first-named, or striped yellow and black species, differs from the rest in this respect, as it merely covers the filaments with its cast-off prickly skin, holding it at an angle of 40 degrees, where it can be of no possible protection. This species has been by far the most numerous the past season, and in this its larval state is of a dirty white or cream color, with usually a more or less distinct bluish-black mark along the back. The larva of *C. aurichalcea* is dull brown, with lighter sides, head and feet, and carries its dark excrement and cast-off skin in a mass as broad as long, close to the back. These larvæ attach themselves to the leaf by the latter portion of the body and become pupæ, with the old larval skin still attached posteriorly. The pupa is also spined, all the species mentioned being in this state, of a more or less intense yellowish-brown, except that the *Deloyala purpurata*, which is of a bright grass-green, and is further characterized by its larger size and by having the spines of the body turned under, so as not to be visible from above.

APPLE-TREE BORERS.

The two beetles which bore into the apple tree are well known to you all, and I have only to relate of my observations this year, that the flat-headed species (*Chrysobothris femorata*) has been found in greater numbers than the round-headed species (*Saperda bivittata*). With regard to the latter, our friend, D. B. Wier, of Lacon, feels convinced that it lives in the three years, and, to convince me, promised to send three different sizes of the larval state of the insect at the same time. From their not being forthcoming—from having received them of but two sizes from F. M. Norton, of Wilmington, and from analogy, I am compelled to accept the testimony of Asa Fitch, of New York, who has probaby given more time to the history of this insect than any other man in the country. He says that the egg being deposited in June, the borer is full grown at the end of the second September, or fifteen months from time of birth; it then changes to pupa, and remains in this state through the winter, till spring, when it becomes a beetle, and, after lying in this state for some time, leaves the tree in June. It is thus in the tree a few days less than two years, in the latitude of New York.

BARK LICE (*Coccidæ.*)

Our white native species of bark louse (*Coccus Harrisii*) I have met with on but few occasions, and have had no opportunity to study; but the imported species *Aspidiotus conchiformis*, though almost unknown in some of our southern counties, is so common in the rest of the State that scarcely an orchard can be found without it. I have given this insect considerable attention during the season, not allowing a day to pass without making observations.



These figures are highly magnified, the hair lines at their sides approximating the natural lengths. Figure 1, egg—natural size scarcely .01. Fig. 2, larva, as it appears when running over the twigs—natural length .01. Fig. 3, its appearance soon after becoming fixed. Fig. 4, appearance of scale after the second plate is formed. Fig. 5, form of louse (ventral view) soon after losing its members. Fig. 6, form of louse (ventral view) when full grown and just about to deposit. Fig. 7, fully formed scale, containing louse, as it appears from the underside, when raised. Fig. 8, highly magnified antenna of larva, showing joints.

Prior to any general remarks, a few extracts from my journal, together with some figures expressly prepared, will be of interest as showing this insect's mode of growth.

June 6th.—Most of the eggs are hatched, but the young have not yet left the scales.

June 9th.—The past two days have been exceedingly warm, the thermometer rising above 90 degrees F. in the shade, and the young lice are running all over the twigs.

June 11th.—They have all become fixed, having gathered in the greatest numbers around the base of the lateral shoots of the terminal twigs.

June 12th.—A white, waxy secretion commences to issue from the body in the shape of very fine, delicate threads (see Fig. 3).

June 22d.—They have increased materially in size, the waxy secretion vanishing soon after the last date, leaving what appears to be the body of a yellowish-brown color, though in reality the body is underneath and separate, and has lost all trace of members.

July 1st.—Though watched every day, there is no perceptible change since the 22d of June.

July 2d.—They are now 0.03 long, or three times as large as when hatched, and a thin, waxy secretion commences to appear at the posterior end.

July 6th.—This secretion has increased rapidly and taken on a somewhat oval form, with usually a slight cut or depression posteriorly. It appears quite distinct from the original yellowish-brown portion, and is duller or of a more greyish color. On raising it carefully the louse is seen underneath, yellowish, of a flattened form, the anterior tapering more than the posterior portion, which latter is always distinguished by having a patch of bright reddish-brown (see Fig. 5). Though from analogy it must have a beak of some kind, it is so exceedingly fine and fragile that I have never been able to perceive it.

July 10th.—There seems to be another pause in the growth, the scale presenting the appearance of Fig. 4.

July 12th.—A third plate or secretion has commenced from the posterior portion.

July 15th.—This last plate enlarges rapidly, and is the exact color of the bark.

July 20th.—The three plates are at present readily distinguished ; the last, which is considerably larger than the two others together, having usually taken a slight curve, which gives the scale its characteristic form.

August 1st.—Their growth is to all appearances completed, the scale measuring 0.12, while the louse measures but 0.05, occupying thus about half the space within. The three different growths are now not readily distinguished, though the narrow end is always reddish-brown. On lifting the scale the insect does not fall out, being retained by a slight whitish fringe extending from each side of the scale (see Fig. 7.)

August 12th.—Some of them have commenced to deposit eggs.

August 28th.—The eggs are now, apparently, all deposited, and I have watched with interest, as the deposition went on, the body of the parent louse shrinking day by day, instead of extending and becoming gravid, until it is now a mere atom at the anterior or narrow end of the scale, in a few days scarcely to be noticed at all.

These notes were made in Cook county, and whether the eggs will hatch this fall, producing a second brood, or not, I cannot yet positively say; though I am pretty sure they will not, since the summer's growth of wood is exempt from them the following spring.*

All writers on this bark louse—closet naturalists, as friend Walsh would term them—copying after Fitch and others, tell you that the scale you see on your trees is the gravid body of the female insect, and, following their teachings, I once thought so myself. Now, though for aught I know the body proper of the female may, in some Coccidan species, extend and cover the eggs she deposits, it is no such thing in this instance; and I am prepared to affirm that the scale is no more the insect's gravid body than is the empty muscle shell the distended outer membrane of the muscle, or the oyster shell that of the oyster.

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*I have since ascertained that they do not hatch, and that this insect is undoubtedly single-brooded.

How this scale is formed I do not profess to have discovered. With regard to our native white species (*Coccus Harrisii*), Mr. Walsh, in the Practical Entomologist for December last, refutes Harris' theory, namely, that it is formed in the same way as the down which exudes from other lice, and shows, with some plausibility, that it may consist of the cast-off skins of the insect. Now, in my own humble opinion, with the imported species under consideration, I am inclined to uphold Harris, for the following reasons: besides the fine waxy filaments which it secretes when becoming fixed, I have found that, even before these are thrown out, it is covered with a fine, white bloom, proving that it can and does secrete from the general surface; having carefully lifted the scale, every day during the growth of the third portion referred to, the louse has invariably been found in the same shape and condition, without apparent connection with it, while the scale actually increases in bulk during the time the eggs are being deposited. Furthermore, the exuvia of such a tiny insect would be infinitely thinner and more delicate than is the scale, and as the insections, especially of the venter, are always plainly visible with a glass, in the louse we should expect to see them in the scale, which is, however, perfectly smooth. Again, the louse is of the same color throughout its growth, while at one time the three parts of the scale are perceptibly different in this respect. Moreover, Reaumur long ago (Memoires, tom. IV., p. 26) observed a species occurring on the peach in France to cast its skin in flakes, much in the manner as many of our *Dipterous* and *Hymenopterous* larvæ are known to do; while he also described a species (pp. 64, 65, ibid.) occurring on the vine, which covered its eggs with a white, gummy, cottony secretion; and Mr. Walsh himself, in the February number of the little monthly already referred to, p. 57, speaking of a species occurring on the under surface of the leaves of the Olea fragrans, shows how in that species the "scale" is not formed of the lifeless body of the female, but is a distinct integument, constructed by the female to protect herself and her eggs, and probably secreted from the general surface of the body.

However, I believe that the entomologist will have about as difficult a task to ascertain its real mode of growth as would the physiologist to learn how the flesh on your fingers acquires its natural form. We might with equal reason try to learn why and how the thousand different excrescences and galls caused by insects are formed! Why is it that the larva hatching from an egg deposited on a rose leaf by a little four-winged fly, the *Rhodites ignota* of Osten Sacken, causes a peculiar growth or gall in the form of a mangold-wurzel, or beet seed, to surround it, while that of a similar fly, belonging to the very same genus—the *Rhodites radicum* of Osten Sacken—hatched from eggs deposited in the root of the same plant, causes an entirely different gall? Why is it that the puncture of a little yellow louse, *Pemphigus* (?) *vitifoliæ*, Fitch (or as Henry Shimer, of Mt. Carroll, would have it, *Daktylosphaira vitifoliæ*), by puncturing a grape leaf, causes an unnatural growth to surround and entomb it in the shape of the little green globular galls of different sizes, so common on your Clinton grape vines last year, while the same sized puncture of another louse (*Aphis vitis*) produces no such effect? Why, again, does a little Lepidopterous larva, often found in the golden rod (but I believe undescribed), produce an elongated hollow gall, while a Dipterous larva (*Trypeta solidaginis*) in a neighboring stalk produces one that is round and solid? Or, lastly, why should the suction of different species of Dipterous larvæ (*Cecidomyæ*), produce the wonderful galls found on our willows, causing in many instances not only a total change in the texture of the leaf, but also in its mode of growth?

To me the formation of our bark-louse scale appears somewhat analagous to all of these, and a thousand other such phenomena known to science; and in answering how such growths, peculiar to each species, are formed, or why each is so constant in its character, I can only say that it is their nature; or, with Devere, "that knowledge of first causes belongs to Him alone, who allows the eye of man to see final causes only." The more we endeavor to study the why and the wherefore of these things the more the mind is filled with the idea of Infinity, and escaping from all visible impressions of space and time rises to sublimest contemplation of a Creator—German atheism and materialism notwithstanding.

The growth of the scale under consideration depends no more on the will of the louse underneath it than does the sponge on that of the slimy, jelly-like creature which secretes it, or the coral on that of its polype; or, to use a more patent illustration, than the growth of our bones, though secreted from our organs, depends on our will.

By carefully lifting one of these scales during the months of July and August, any of you may find the true louse underneath, occupying but a portion of and being quite separate from it.

From analogy we may presume that there are males as well as females of this species, since winged males are known to occur in the genus *Aspidiotus*, and it has been my great aim and hope to discover this gentleman. Though an extremely small percentage of the scales may generally be found dwarfed and empty during the first days of August, suggesting that a male may have escaped, yet as likely as not these may have been killed by some cause or other. In the latter part of June I counted five hundred scales on a single twig, and marked them to prevent mistake or confusion in recognizing them again. After watching them steadily and carefully lifting each one on the

28th of August, they all, with the exception of two, were found to contain eggs. The same average would doubtless have been found over the whole tree; and from this fact I am constrained to believe that as a rule no males appear, and that if there be exceptions where they do occur, they are in such proportion as to be of little avail. Mr. Shimer, in speaking of the Clinton grape gall, already alluded to, states that he opened thousands of them before he found a male; and it is difficult to conceive what effect a single delicate male, shut up in a gall, could have on the thousands of others not dignified by his presence. When we reflect on the abnormities occurring among our Aphides, I see no reason why our Coccids should not be hermaphrodite as a rule, and yet occasionally produce males. They are still lower in the scale of nature than the Aphides, and one of them—the celebrated Cochineal—puzzled naturalists a long time as to whether it was a plant or an animal. There is in fact so much of the anomalous about this family that it furnishes a rich and interesting field of study.

This muscle-shaped bark louse, though essentially belonging to the apple tree, is not unfrequently found upon the currant, plum, and pear; and Mr. T. D. Plumb, of the State Journal, Madison, Wisconsin, recently sent me a young pear which was literally covered with them to the number of about one hundred, in an almost full grown state, and as I discovered from specimens of the *White Doyenne* pear and *Transcendant Crab*, sent later in the season at my reqqest, they fully matured and deposited their eggs. Mr. Plumb also wants to know, since this insect is damaging the fruit interests of the United States to the amount of millions of dollars, why it is not worthy the attention of men, legislators, or even the government?

THE CURCULIO (*Conotrachelus nenuphar*, HERBST.)

This little rascal needs no introduction to the members of this society, and as Mr. Walsh, in the April number of the Practical Entomologist, gave a most complete and exhaustive account of it, which every member ought to read, I shall not go over the same ground, but will give merely a few dates that will enable you to better understand its history. These dates are given for the southern portion of the State—that great fruit region—where the curculio plays so conspicuous a part.

First bear in mind that it winters over in the perfect or beetle form, and that those which puncture the fruit when it is the size of a marble are well nigh a year old. Next bear in mind that—though as a rule insects are short-lived in the imago or perfect state, and deposit all their eggs soon after arriving at that condition—the female curculio takes her time, so that weeks, or even months, may elapse before she has intrusted the last of her precious burden to its juicy cradle. Most of the fruit is punctured when of the size already designated, or about the first of May, and the young larvæ are full grown, and quit the fruit to enter the earth by the middle of June. The fruit usually falls to the ground, so that they have no difficulty in entering it; but not unfrequently remains on the tree. In the latter case the larva must undergo its transformations to the beetle in the fruit—which it probably does—or descend to the ground by some other means. It has no feet to crawl with, and so far as I am aware none of the larvæ of the great curculio family have the power of spinning web; but I will mention the fact for what it is worth, that, while cutting into apples one afternoon, for this insect, one of the larvæ actually descended by means of a web, and the question was inevitable—is this curculio an exception to the rule, and can it thus let itself down? As the majority of the apples cut into contained the codling moth worm, and I handled many of them the same afternoon, I account for the occurrence by its getting in the web of that insect on my fingers.

Burrowing into the ground these larvæ form little cavities in which, by the first of July, they have changed from larvæ to pupæ, and from pupæ to beetles, and should the ground be very dry at this season they will remain there in the beetle state for some time and all issue at once after the first rain. They usually leave their earthy resting place, however, two or three days after becoming beetles, or during the first days of July. While in the ground the curculio is entirely of a reddish color, and its characteristic cream-colored and shiny black markings, and hardness of elytra, are not attained till it has basked for some time in the light of the sun. This young brood may be seen on the fruit at the same time with the old ones of last year, which, however, soon begin to die after this period. The young brood are generally brighter colored, and have a greater freshness than the old. We thus see that while a mother curculio who hibernated may be depositing the last of her eggs, a beetle reared from an earlier deposited egg may be at her side, as well as at that of its yet unborn brother or sister. One would naturally suppose that these early developed curculios would go to work depositing, and produce a second brood; but if any of them do, it is the exception; for the great bulk of the first brood of larvæ found in a full grown condition, the fore part of July, do not leave the ground as beetles till the middle of August, and many of them till much later; and did they deposit for a second brood, it would be impossible to grow any late stone fruit, while the majority of such a second brood would certainly not have time to mature. Moreover, Dr. Trimble relates, after dissecting a great number of them, that whether developed as early as July or as late as September, none of them contained eggs, and were incapable of reproducing their kind till after having passed through the winter in the torpid state; living through the fall on the fruit, or even on the tender twigs when fruit fails.

In Union county this insect is fought with such persistency that it would soon be exterminated were it not for the continual supply from the woods.

I have found the larvæ very abundant in the cherries in Kankakee county, and have this year bred it from numbers of the early harvest apple, taken from Mr. G. H. Baker's orchard; and Mr. Baker assures me he has found it in the pear, a fact of which I have not the slightest doubt, though denied in most of our fruit books, and Dr. Warder, judging from his construction, rather thinks it is wrongly accused. That such facts as these are not more readily ascertained and universally known, is owing entirely to the want of good illustrations. Written descriptions of an insect, no matter how plainly worded or lengthy they may be, are of little use to the horticultural or agricultural community; whereas, a good illustration is at once a substitute for the text, impressing those unversed in technical terms far more correctly.

The only good illustration ot the larva of the curculio, as found in the fruit, is that by Townsend Glover, in the Agricultural Report for 1854, pl. 7, and even in that some characteristic markings on the head and first segment are lacking.

THE CODLING MOTH (*Carpocapsa pomonella*).

This insect likewise needs no introduction, at least not in words, though a good illustration of the perfect insect might do good service; for, notwithstanding the worm is so well known to everybody, many of the most intelligent fruit-growers are yet unacquainted with its parent. The apple is, so to speak, our democratic fruit, and while stone fruit is grown but in certain regions, this is cultivated all over the country. The codling moth is then by far the most injurious of the two. Unlike the curculio, it is mostly two-brooded, the second brood hibernating in the chrysalis state, inclosed in a snug little silken house, and ensconced under some fragment of bark or other shelter. The same temperature which causes our apple trees to burst their beauteous blossoms, releases the codling moth from its pupal tomb, and though its wings are at first damp with the imprint of the great stereotyping establishment of the Almighty, they soon dry and expand under the genial spring-day sun, and enable each to seek its companion. The moths soon pair, and the female flits from blossom to blossom, deftly depositing in the calyx of each a tiny yellow egg. As the fruit matures, the worm develops. In thirty-three days, under favorable circumstances, it has become full-fed; when, leaving the apple, it spins up in some crevice, changes to chrysalis in three days, and issues two weeks afterward as moth, ready to deposit again, though not always in the favorite calyx this time, as I have found the young worm frequently entering from the side. Thus the young brood of codling moths appear at the same time as the young curculios, the difference being that instead of living on through fall and winter, as do the latter, they deposit their eggs and die, it being the progeny from these eggs which continues the race the ensuing year. Though two apples side by side may, the one be maturing a curculio, the other a codling moth, the larva of the latter can always be distinguished from the former by having six horny feet near the head, eight fleshy legs in the middle of the body, and two at the caudal extremity; while the curculio larva hasn't the first trace of either. That of the codling moth usually acquires a pink or flesh-colored tint when mature, and in quitting the apple generally leaves a mass of brown excrement at the point of exit, as much as to say to the orchardist—though not fool enough to let you know of my whereabouts, while in the apple, I have no objections to your knowing that I have been there and am gone.

TOMATO WORM.

Under this head you need not fear an account of that old foe, the sphinx—better known as the tobacco worm. There is another caterpillar of smaller size, 'tis true, but far more injurious than its sphinxy relative. I refer to a caterpillar that feeds upon the fruit of the tomato and seldom attacks the leaves. The mention of this will doubtless introduce him to you more satisfactorily than would a description, since this insect varies greatly in color, as well in the caterpillar state as in that of the imago. Two years ago Mr. A. M. Lawyer, of South Pass, sent me by express some tomatoes with two of these worms feeding upon them; but they had so far decomposed on the journey that I could not breed them. This year, however, I succeeded; though whether friend Holcomb, who promised faithfully to rear some, succeeded or not, I cannot say. Early and late corn is greatly injured in all the southern States and in the southern portion of Illinois, by a worm that feeds upon the silk and the green kernels. Should any of you have suffered by this insect, brand him as a curse, for it is the same gentleman that hollows out your tomatoes. Throughout the cotton-growing States they are troubled by a worm that eats into the boll, and which is known in consequence as the "boll worm." Brand him, too, as a curse, for it is the same fellow that eats your tomatoes. It is not even content with the injury done in these three manners; for Mr. Townsend Glover, of the department, informs me that he has found the same worm boring into the pumpkin. This appears to be another of those insects from whose ravages our northern brethren are, happily, almost exempt. It is two-brooded, the first worms being full grown the fore part of July, the second brood the fore part of September. The first moth, with me, though transported to a more northern latitude than it was accustomed to, issued on the 6th of August. The same insect went into the ground on the 20th July, and had changed to chrysalis, of the normal form and mahogany color, three days afterward. This worm may be found of all shades of green, yellow or brown, but has, invariably, numerous more or less distinct black piliferous spots. A good figure is given by Glover, in the Agricultural Report for 1854, pl. 3, under the head of "Boll Worm," and that on pl. 4, under the head of "Corn Worm," is a mere variety of the same insect, though not then fully understood by Mr. Glover. Its scientific name is *Heliothis armigera.* The moth is yellowish with a shade of green, but quite variable in the depth of shading, though constant in having the hind wings margined with a black band, which has a spot of the same color with the rest of the wing in its middle. It is well figured on the plates already referred to. This insect is quite numerous the present season.

CORN-COB BORER.

An insect is sometimes met with boring entirely through the cob of growing corn. It is a worm of yellowish or livid hue, with numerous black dots. It produces a moth which Guenee named *Gortyna nitela.* It may frequently be found boring into the common cocklebur and several of our garden plants, such as the dahlia and aster. An account of it, with rather poor figures, may be found in the Prairie Farmer of the 22d February last.

THE ZEBRA CATERPILLAR.

This insect was named by Melshimer, who called its caterpillar the "zebra," on account of its stripes. It is a black worm with a red head and two lateral yellow lines, with numerous transverse white, zebra-like, finer lines between them. It may be met with in small numbers every year, but has never attracted such general attention as this season. It has swarmed all over Cook county, and I have scarcely an acquaintance but has complained of its ravages.

In the early part of June they were found in great numbers, about a week old, on the young cauliflower and cabbage. The moths from these worms commenced issuing the first days of August, and by the 20th of the same month the second brood of worms were found in vastly greater numbers, not only destroying the different plants of the cabbage tribe, but collecting in hundreds on the heads and flower buds of asters; on the whiteberry or snowberry (*Symphoricarpus racemosus*); on different kinds of honeysuckle, and a variety of other plants. They are lighter or greener when young than when older, and being at this time gregarious, are readily destroyed by a decoction of lye or by hand. Before changing to pupa each interweaves a few grains of sand with silken thread, just under the surface of the ground. The fore wings of the moth are of a beautiful and rich purplish brown, having two lace-like white spots and a delicate, lighter brown or yellowish shade in the middle. The hind wings are white in contrast.

This report is already longer than was intended, and though there are other insects that should be spoken of, I must close it with a brief allusion to a few of those that have been numerous this year on the vine.

THE AMERICAN PROCRIS.

This insect, *Procris Americana,* has been decidedly so. The caterpillar is of a sulphur-yellow color, with a transverse row of six black, prickly, elevated spots on each segment. The eggs are deposited in clusters, and in twenty-five to thirty days from time of hatching the worms, which then measure rather more than half an inch, spin dirty white flattened cocoons, mostly in clusters, on the leaf. Three days afterward they become chrysalids—also somewhat flattened and of a shiny yellowish brown; while in ten days more the moths issue. The moth is black, with delicate muslin-like wings, a deep orange collar, a fan tail, and is well figured in Harris, p. 336.

THE GRAPE-VINE SELANDRIA,

A false caterpillar greatly resembling the last, and having the same habit of feeding side by side, I have also found quite numerous. It differs mainly in being of a more greenish-yellow, in having two transverse rows of black spots instead of one, and in having twenty-two legs instead of sixteen. When full grown it enters the ground, forms a fine but tough cocoon, and finally changes to a black four-winged fly, belonging to the order Hymenoptera, and known as *Selandria vitis*.

The large but pretty caterpillar of *Sphinx myron* has also been more common than usual. Though solitary, it will sometimes strip a vine before being noticed. It is pea green, and distinguished mainly by the small size of the first two segments, and the comparative large and swollen appearance of the two next; also, by a row of yellow patches, with a lilac-colored center, along the back. It changes to a chrysalis inside of or under a leaf, of a light fleshy yellow, speckled with brown, the joints of the three largest abdominal segments being also dark brown. A good colored figure may be found in Harris, pl. V, fig. 4.

THE GRAPE-LEAF FOLDER,

More injurious, however, than any of these, is a worm that may be known by the above name. It is glass-green and folds a leaf, or attaches two that may be close together, by aid of a few silken threads. It is very active, jumping and jerking at the least touch. It acquires a flesh-colored hue just prior to changing to chrysalis, which it does usually within the leaf. Many which thus changed with me on the 21st July, became moths on the 29th of the same month. The moth is pretty, the wings being of a glossy purplish black, edged with white, and with white spots in the middle of each. There are also two white bands on the abdomen of the female, the male differing slightly from her, especially in having the antennæ clubbed in the middle. This is the *Desmia maculalis* of Westwood, and though so very numerous in the South, was found for the first time this year in Cook county.

Two other insects, both belonging, apparently, to the curculio family, are quite numerous this year on the grape, the one living in and causing a discoloration of the fruit; the other causing a knotty swelling of the young wood. The early period of your assembling prevents my giving their complete history; and in order to thoroughly investigate them, it is hoped that those having vines troubled in this way will furnish me with specimens. I shall also be glad at any time to receive the following insects, which are apparently new to the world: one which affects the terminal buds of the apple tree, and which Mr. O. W. Murtfelt informs me had checked the growth and greatly injured the trees in the vicinity of Rockford; also, one which bores into the wheat stalk and issues through a round hole in the middle of it.

The little white thread-like worm, spoken of at your last meeting, which is found in the detritus of the peach tree, wherever the borer works, has proved, as I supposed it would, to be the progeny of a little harmless two-winged fly belonging to the genus *Mycetophila*, and which, since it appears to be unnamed, I have provisionally called *Persica*. You will also find in the last volume of the Prairie Farmer the complete history, with illustrations, of a worm affecting your strawberry plants; of one attacking clover hay, and of five cut-worms, two more of which I have since bred.

The strawberry worm is the progeny of a four-winged fly, which was named *Emphytus maculatus* by Norton, and there is reason to believe that a distinct variety exists; for the strawberries at Rockford, Illinois, and Cedar Bluffs, Iowa, have this year been preyed upon by a worm of the same size and similar habits, but differing in some other respects, and principally in the head having but one black eye-spot each side, instead of being marked as described in the article referred to. The clover worm is the larva of a pretty little month, known as *Asopia costalis*, Lederer; while the cut-worm moths, as described, are respectively known as *Agrotis subgothica*, *Agrotis Cochranis*, *Agrotis telifera*, *Noctua canldestina*, and *Celæna renigera*. The two which have since been bred are known as *Agrotis devastator* and *Hadena juncta*, both named by Guenee. The larva of the former is the common glassy looking cut-worm, having the body of a translucent glaucous color, with a reddish-brown head and cervical shield in high contrast with it. That of the latter is speckled with grey, flesh and rust colors. A more detailed description would not edify you as a body, and will be given at some future time for those interested.

Respectfully submitted,

CHS. V. RILEY.

CHICAGO, Aug. 30, 1867.

THE WINE DISTRICT OF MISSOURI.

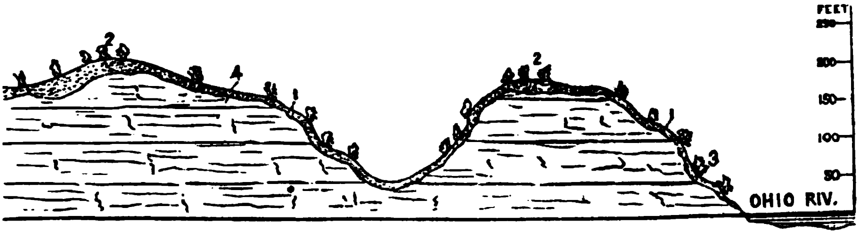
BY J. VANCLEVE PHILLIPS, GEOLOGIST AND MINING ENGINEER.

DUBUQUE, IOWA, *August* 30, 1867.

To the President of the Mississippi Valley Grape Grower's Association:

DEAR SIR: I notice by the papers that the Grape Grower's Association of the Mississippi valley meet in St. Louis on September 11th, and having some knowledge of the growth of wild grape vines over some ten counties in Southeast Missouri, I take this opportunity to lay the facts before your association.

I came to Missouri in 1856, for the purpose of making a reconnoisance of the lead field, and went from St. Louis to the Iron mountains, and from there to the copper region in the south part of Shannon county; then east to Cape Girardeau, northwest to Fredericktown, west to Pilot Knob, and Salem, in Dent county, and north to Gray's Summit, on the Pacific railroad. I traveled on horse-back, and made a section of the clay and rocks along the creeks and rivers crossed on the route. This was prior to the examinations made in that region by the State Geologist, and in this way was gained the first general knowledge of the geology of this district. I had spent ten years previous principally in the upper lead fields of Iowa, Illinois, and Wisconsin, and on coming to Missouri was astonished at the great amount of wild grapes growing in that region. I had been in the habit of seeing wild grape vines from one to two inches in diameter; yet along the Meramec, Big river, St. François, and other rivers that flow out from the Iron mountains, and the great water-shed extending west, it was quite common to see grape vines from five to eight inches in diameter, and climbing to the top of the highest trees. I was engaged more or less of the time from 1856 to 1861 in examining this region, and in that time explored through every township in the following counties: St. Louis, Franklin, Jefferson, Crawford, Dent, Iron, Shannon, Reynolds, Carter, Wayne, Madison, Bollinger, and St. François. The growth of wild grape vines and vineyards planted was a side issue, yet it came so fully under my observation that I necessarily was gaining knowledge of it continually. Since 1861 I have had an opportunity to examine the grape district around Indianapolis, Cleveland, Cincinnati, and New Jersey, and, having a knowledge of the elements of the soils and altitudes, to compare these with the soils and altitudes of Southeast Missouri.



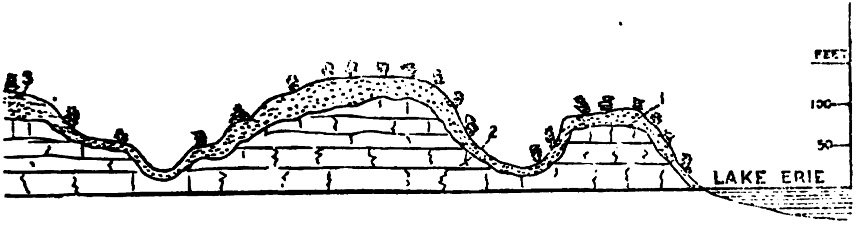
Geology of the lands planted with grape vines about Cincinnati, Ohio.—Vertical section of strata of ridge near Cincinnati.—Length of section, two miles.

1. Vines planted on the sides of steep ridges. The clay in these localities has been formed by the decomposition of the rocks above, and is from one to two feet deep, the edges of the limestone in many places being uncovered. This is a clay made up of sand, lime, magnesia and decomposed vegetable matter, with a small per cent. of the oxide of iron.

2. Deeper clays on the summit of the ridges, with more sand and decomposed vegetable matter, and less oxide of iron.

3. Vines planted on the sides and summits of the ridges.

4. Limestone, known as the Cincinnati limestone, and belongs in the upper silurian rocks; a pale yellowish magnesian limestone, interstratified with blue clay shales.



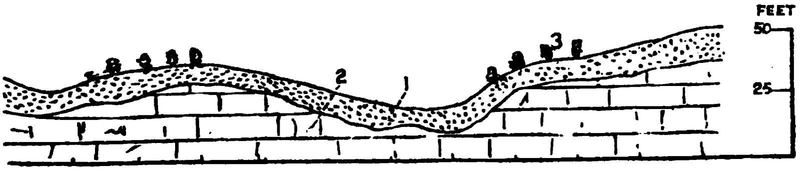
Section of strata of ridges about Cleveland, Ohio, where vines are planted.

1. Clay overlying the summits and slopes of ridges, from six to twenty feet deep.

This clay has an under stratum of sand and gravel, topped off with several feet of alluvial, formed by decomposition of shales, and a dressing of black soil, formed of decomposed vegetable matter.

2. Shales and limestone interstratified and lying nearly horizontal.

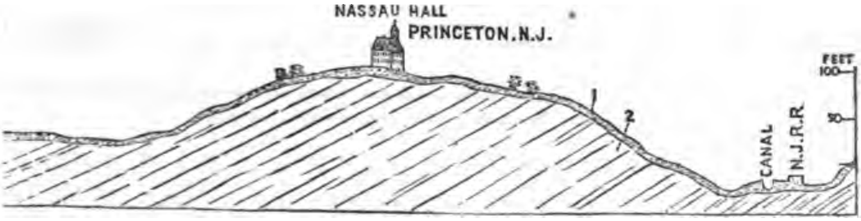
3. Deep clay on the summits of ridges; very little of oxide of iron in these clays.



General section of ridges around Indianapolis.

1. Clay overlying the strata, from six to twenty feet deep.
2. Limestone of carboniferous age.
3. Grape vines planted.

This limestone is a soft crumbling rock, interlaid with blue shale, and very little of the oxide of iron in it.

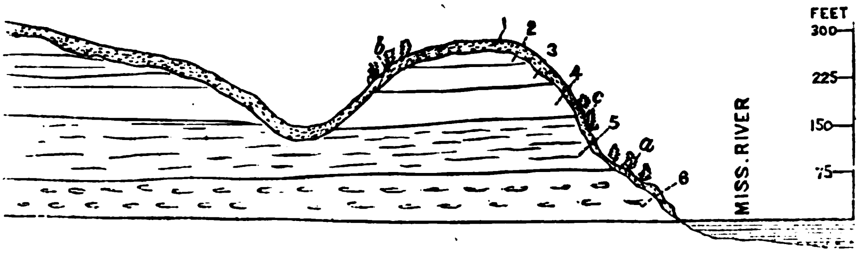


Section of strata, Princeton, N. J.—Drawn north and south through the ridge on which the town is built.

1. Clay from one to three feet deep, formed by the decomposition of the provincial New Jersey "red shell," or new red sandstone.

There is a large amount of the oxide of iron in this clay; the clay being red and gritty, grapes are planted to some extent in gardens, and grow strong and thrifty, but very slow, as compared to vines in Missouri, and are liable to mildew, probably caused by the fogs and damp air of the ocean and want of proper food for the plant.

The formation of Kelly's island, on the Ohio, I am not familiar with, but suppose it to be the same as other islands on the river, and made up of a deposit of sand with clay and black soil, formed by decomposed vegetable matter.

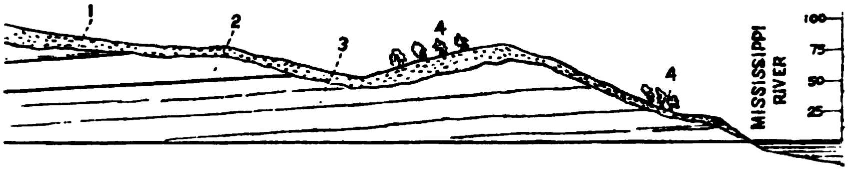


Section of strata at Dubuque, Iowa, where grapes are planted.

1. Clay from five to twenty feet deep, alluvial deposit, with water-worn pebbles of white, red, and yellow flint, in layers three and ten feet from surface.
2. Yellow, unctuous pipe clay.
3. Blue clay shale.
4. Yellow magnesian limestone, known as cup rock.
5. Upper Galena limestone, a yellowish gray arenaceous limestone.
6. Lower Galena limestone, a hard gray limestone, interlaid with flint.

a. Position of Judge King's vineyard.
b. Vineyard at West Dubuque.
c. Position of A. P. Farley's vineyard.

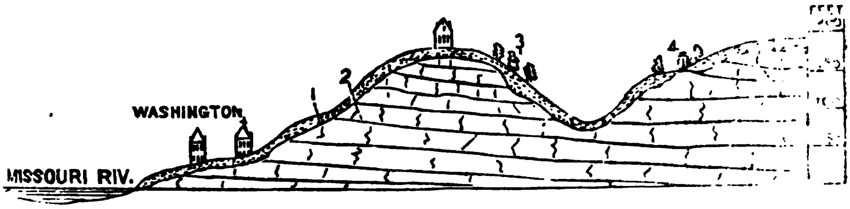
These rocks are lead measures, and of lower silurian limestone age.



Section of strata, St. Louis county, Missouri, showing where vines are planted.

1. Clay from five to twenty feet deep, alluvial formation.
2. Coal measures.
3. St. Louis limestone.
4. Vineyards.

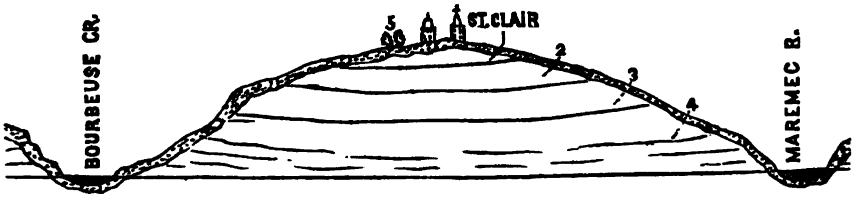
There is only a small per cent. of the oxide of iron in this clay.



Section of strata south side of Missouri river, at Washington, Franklin county, Missouri.

1. Clay from five to twenty feet deep, alluvial formation, light colored, smooth spading, with beds of water-worn gravel interstratified in the clay from six to ten feet from the surface.
2. Limestone of upper silurian age.
3 and 4. Location of vineyards.

The formation here is much the same as at Hermann—the rocks, clay, and altitude. This clay contains but a small per cent. of the oxide of iron.



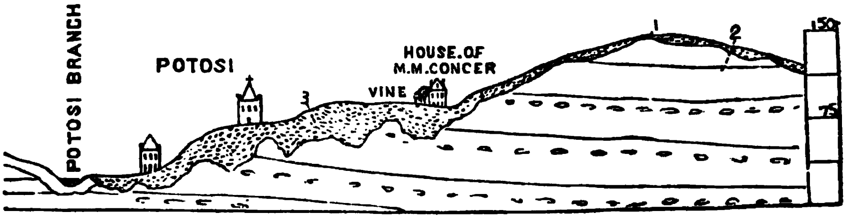
Section of strata from Bourbeuse to the Meramec river, through St. Clair, Southwest Branch Railroad.

1. Saccharoidal sandstone.
2. Second magnesian limestone.
3. Second sandstone.
4. Third magnesian limestone.
5. Position of Massey's vineyard.

The summit of this ridge is three hundred feet altitude above the Meramec and Bourbeuse rivers, and six hundred feet above the Mississippi river at St. Louis. There is a large amount of the oxide of iron in this soil. The natural growth of timber is a scrubby black and white oak.

In 1859, in Mr. Massey's yard, the third year growth from vines planted by digging with a pick in the natural, unplowed soil. On the summit of this ridge I was shown clusters of Catawba grapes twelve inches long, and the berry remarkably fine and flavor excellent.

This is supposed to be a superior district, both from its altitude and the elements in the soils, to grow grapes.



Section of the strata of ridge north of Potosi, Missouri, showing where the old stalk, in 1861, *threw out and grew twenty-five vines that averaged from ten to twenty feet in length, being one season's growth. The grape was a large, thick-skinned, black grape, brought by Mrs. E. M. Perry from Virginia, about* 1840.

1. Thin stratum of clay over limestone; rocks exposed in many places; a scrubby growth of black oak and black jack timber; old lead diggings.

2. Third magnesian limestone.

3. Red clay filled with geodiferous quartz, called by miners "lead blossom." This clay is a high red color, and twenty feet deep. It will be noticed that the ground rises fifty feet above Conyers' house, and that this would give a continual drainage of moisture to the deep clays where this vine grew.

These vines grew on a rude border along the front of the cottage house, and literally covered the whole front in one summer's growth. Evidently the great growth was due to the old roots, that had ramified deep and wide in the clay, this clay being filled with the oxide of iron, and silica, and other elements to make up the proper food for that plant.

On the opposite side of this valley, and south of Potosi branch, and where the slope is toward the north, and clay and rock much the same (the ground being covered with old lead diggings), is a remarkable growth of wild grapes, as much as one hundred acres being covered with vines, and growing over low bushes and on trees. This district is six hundred feet altitude above the Mississippi river at St. Louis.

We will now pass in review the sections at the different localities named, and give impressions of the value of each point as a grape-bearing district.

CINCINNATI, OHIO.

The vines here grow small and slow as compared to Missouri. The soil, where planted, generally has not a sufficient depth of clay and the oxide of iron necessary to perfect the seeds and skins of the fruit, and the lands planted will soon be exhausted of the elements forming the natural food of the plant; and to make the district wine producing any length of time it will require the continued setting out of new lands. Just the same as raising peaches in New Jersey: one or two crops of peaches will so exhaust the naturally weak trees—having sucked out all the elements in the soil necessary to grow peach trees and bear fruit—that the production of the peach is kept up by continually planting new lands. The lands planted with vines about Cincinnati may be considered as third and fourth rate wine lands to those of South Missouri.

CLEVELAND, OHIO.

There is a moderate amount of vines planted at this point. The clay lacks the oxide of iron; the vines grow small and slow, and the juice lacks body. This must be ranked as a third and fourth rate wine producing district.

INDIANAPOLIS, IND.

The soil here is gravelly and sandy, and lacks the oxide of iron; can hardly be considered as favorable as Cleveland or Cincinnati for growing grapes. The wine lacks body and flavor as compared to the Missouri Catawba.

NEW JERSEY.

The growing of grapes in New Jersey is not a settled branch of industry. To be carried forward to any extent it would require the continual setting out of new vineyards, as a few good crops would exhaust the grape-growing elements from the soils, and the vines would die out from the want of proper food.

DUBUQUE, IOWA.

The growing of grapes about Dubuque has not proved profitable. The lands planted, as shown in the section, are probably not the best that could be found in this region. They lack the oxides of iron which exist in other lands in this district. The climate is probably too cold to make grape growing a success, it being necessary to lay down and cover the vines with straw and clay to protect them from the frost and snow through the winter.

ST. LOUIS COUNTY, MO.

The clays in St. Louis county lack the proper oxides of iron to grow grapes to any great amount. As soon as the proper sustenance for the plant is exhausted from the soil to perfect the seed, the berry is attacked with the blight, and rot, and mildew. Like a child teething, whose mother drinks cistern water, or lives in a sandstone district; the teething period is always dangerous, as the forces of the system are set in violent action to eliminate lime from all parts of the system to grow teeth; whereas had the child a proper supply of limestone water to drink the difficulty would have been avoided. The theory of old iron around the vines, or driving nails in them, is a temporary help for vines in these localities. These lands must be considered third and fourth rate wine lands.

WASHINGTON, FRANKLIN COUNTY, MO.

The condition in the rocks, clay, and soil here is much the same as at Hermann. There is a lack of the oxide of iron in the soil to grow a perfect vine or berry—that is, for any great length of time. When the vines are first planted, say for six or eight years, the fruit will be comparatively perfect, as the distribution of elements through the clay has been sufficient for a temporary support of the vines. As soon as these elements are exhausted the leaves of the vines will be attacked by blight, and the berry by mildew and rot.

I have not examined the wine lands of Hermann, except as seen from passing in the cars; yet, from what I have learned of the lands planted there, judge that the same remarks will apply to the clay and soil of that district as applied to the lands planted about Washington.

COUNTRY ABOUT ST. CLAIR, MISSOURI, ON SOUTHWEST BRANCH RAILROAD.

On the dividing ridge between the Meramec and Bourbeuse, at an altitude of 300 feet above those streams, and 600 feet above the Mississippi river at St. Louis, we must suppose that lands of first-class character for raising grapes will be found; say from St. Clair to Knob View, some thirty miles, the whole upper part of this ridge may be considered choice lands for planting vines. The elements are in the soils. The clay is red and unctuous, and interstratified with layers of water-worn flint, and from five to twenty-five feet deep, and rests upon irregular decomposed surfaces, fissured limestone, and sandstone strata. The passenger on this road, by noticing the sides of the cuts, will get an idea of the clay and structure of the upper portion of rock. The depth of clay gives the roots of the vines sufficient ground to ramify through, and, when the rock is reached, the disturbed condition of the strata offers the choisest kinds of ground for the roots to penetrate for a lasting supply of food for the support of the vines.

By referring to the section of strata from the Bourbeuse to the Meramec, it will be seen that the dip of the rock is from each river, at a slight angle to the center of this divide; that the center of this water-shed makes the center of a basin of limestone. This is a fact of great importance in planting vines, as all the rain water falling is continually percolating toward the center of the basin and center of the ridge. By this arrangement a sufficient amount of moisture will be retained in the dryest season to support a heavy growth of plants with deep-reaching radicals.

We must suppose that blight, mildew and rot in grapes can all be traced to the same cause: a want of proper elements in the clays to grow healthy, perfect vines. The mildew in grapes is analogous to the rust in wheat—this being due to a want of silica in the soil to grow a strong, healthy stalk; and when the berry is being perfected, and silica is required for the covering, the forces of the plant, if not getting this supply direct from the earth, will eliminate the silica from the stalk, and, being thus weakened, the fogs and dew, for the want of a proper smooth surface to pass off the water, it is retained; this being heated by the sun, and the stalk as it were cooked, and the circulation of the plant stopped, and juices vitiated—hence what we call the "rust in wheat." Wheat seldom if ever suffers from rust on sandy land.

POTOSI, MO.

The great amount of wild grape vines growing on the ridge south of town, and the remarkable growth of the vine on Conyer's place, on the ridge north of town, indicate that this district is peculiarly favorable for growing vines. The altitude is 600 feet above the Mississippi river at St. Louis; the clay on the slopes of the ridges from five to twenty feet deep; the surface of the limestone uneven and filled with fissures; the ridges formed in basins; and the clay a high red color, unctuous, and filled with fragmentary quartz, called "lead blossoms." This clay is highly charged with oxide of iron, and the elements for growing the seed of the grape and vines are in large amount in the clays. The altitude is sufficient for a dry, mellow atmosphere, and fogs are rare. The conditions are first class for growing Catawba or other grapes.

CONCLUSION.

Very few people in St. Louis realize what is to be the magnitude of the wine-growing interests of Missouri. There are 2,000,000 acres of natural wine lands on the northern slope of the great water-shed that divides the waters of the rivers that flow north to the Missouri, and the Current, Black, St. François, and other rivers that flow south to the Arkansas. This dividing ridge is known on the maps as the Ozark mountains. It extends west from the Iron mountains, and is broken, and shows some porphyritic rocks for the first twenty miles, and then flattens to a kind of table land, or wide dividing ridge, and has an altitude through Iron, Dent, and Texas counties of about 1000 feet above the Mississippi river at St. Louis. The country is divided into iron, lead, and copper fields. From this ridge the slope of the country is gradual toward St. Louis, averaging, from Salem, in Dent county, a little over ten feet to the mile.

The belt of the true wine lands we may suppose commences at about 400 feet altitude, and extends up to 800 feet (this is demonstrated by the growth of wild grapes). It will be noticed that all the lands planted in St. Louis county, and at Hermann and other points in Franklin, Washington, and Jefferson counties, except at Masseys, St. Clair, are below the 400 foot line. This belt also passes around east of the Iron mountains, and also south of this, Iron Center.

East of the Iron mountains, and south, the country is formed in part of porphyritic rocks, that rise through the limestone and sandstone in the form of low, oblong mountains. The limestone and sandstone in this region are generally found in the valleys.

From all the information gained in my survey of this region, the lands that contain all the elements to grow vines permanently, and are of the proper altitude, are the lands in the iron fields in Franklin, Crawford, and Dent counties. Next, the lands in the lead fields in Washington, St. François, St. Genevieve, and Madison counties—the sloping uplands along the sides of limestone ridges, where deep red clays are found, being the best. And next, localities in St. Louis, Jefferson, Franklin, and Perry, and Cape Girardeau counties, where the lands have the greatest altitude, and the clay over the rock is red and contains a good supply of the oxide of iron.

The first-named lands, when properly cultivated, are capable of producing 500 gallons of Catawba wine per acre the fourth year from planting, and this amount to increase annually in the future. The other points named will produce more or less, according to location selected.

The recent letters published in the New York dailies from Dr. Bellows, now traveling in the wine districts in France and Italy, are very satisfactory in reference to the influence of wine as a drink on the population. Dr. Bellows writes that he has failed to see a single case of drunkenness in the wine districts, and that he has looked in all the cafes, and saloons, and drinking-houses where such cases would naturally be found. There can hardly be a doubt to the reflecting mind that, to eradicate intemperance from our country, a step of primary importance is to make the country largely wine producing, and in this way stop the importation of the rectified and poisonous liquors now annually bought by our country as foreign wines and brandies. And whatever will hasten this planting of vines and manufacturing of wine in our country, is of the highest importance both in an economical as well as moral point of view.

The casual observer who should examine the country in the belt of lands first named, would pronounce the district a poor farming country. The appearance of dry ridges and gravelly soil would not look inviting to the farmer; yet it is evident that equally as much or more money can be made by planting these lands with grapes, as tilling the richest prairies of Illinois, and the cultivator have a much less arduous labor and equally certain annual return.

The growing of grapes by our people has always been looked upon as a small, inferior business, as compared to other branches of industry. This has come from a want of proper knowledge of the business. The growing of vines on a large scale may be carried on successfully by an association of capitalists as a stock company—as the coal or iron business—or it may be started successfully by individuals with a very small amount of means. As regards a study of this business, the adaptability of the American mind should, with practice, make us equal to the French or Germans to grow grapes, and make us a great wine producing nation.

APPLE GROWING—PRODUCTION, PROFITS.

[A synopsis of the opening address of Major Brooks at the discussion on apples at the New York State Fair, last September. Instructive and spicy.]

Major Brooks prefaced his remarks by saying, "If wars cease according to prophecy; if the conditions of health shall receive respectful attention from all who are not ready and willing to die; if doctors get into a way of curing people, the world will soon be very full of inhabitants, and it will take a great deal to feed them."

The food question is the pressing question of all times, and should be considered, first, in reference to an abundant supply; and, secondly, in reference to quality. He denied that population would ever necessarily be "limited by the means of subsistence;" famine should not fix the boundaries of human life. He said God's laws for the increase of our species are in exact harmony with His laws for the development of sustenance. Some may shut themselves up in stone walls and die of starvation, but Nature's great storehouses, Ocean, Earth, and Air, are full to overflowing with materials for man. It is our business to develop them, so that all who come may be fed and clothed. This beautiful world—portal of the world beyond and all it offers—should never be closed against any by sloth, improvidence, or crime. Woe to the man who shuts the gates of being and of bliss! We are here to work for a common interest; all titles and leases during good behavior. I advocate the enlarged cultivation of apples, because I believe that by no earthly process can so much food for man or beast be extracted from four square rods of ground, as by planting an apple tree in the center and giving it good cultivation. If this is so, the apple may become the great fruit of the future, as indeed it is of the present, from its ability to feed a great many people from a little land.

Major Brooks next compared apple products with the best yields in other departments. General Mills, on the Genesee flats, raised forty-seven bushels and eleven pounds of wheat to the acre on eighty acres.

Captain Scott, of Covington, Wyoming county, raised, in 1822, fifty bushels of wheat to the acre on ten acres; it was drawn to Albany on wagons. Simon McKenzie, of Caledonia, reached about the highest limits possible, sixty bushel to the acre. General Mills raised 115 and John Sheldon 116 bushels of corn to the acre, near Mt. Morris. Four hundred bushels of potatoes were not very uncommon at an early day. Paul C. Sprague, of Wyoming county, on a fraction over one-eighth of an acre, raised one hundred bushels of potatoes, it being at the rate of seven hundred bushels to the acre. Onions have reached about the same figure; and Lyman B. Langworthy, of Rochester, raised about twelve hundred bushels of carrots on an acre.

To be liberal, I will call wheat 60, corn 140, potatoes 700, and carrots 1400 bushels to the acre If any gentleman present has heard of bigger yields, please name them. No one speaks. These rates give 1½ bushels wheat, 3½ bushels corn, 17½ bushels potatoes, and 35 of carrots to four rods of ground. Now see what an apple tree has done. Major Bumphry, Rochester, informs me (and he has probably acquired a habit of telling the truth, for he has not been a political editor in a great number of years) that he knew a tree in Massachusetts that gave in a single season 75 bushels of apples; and you will bear in mind that they grew on about four rods of ground. We have, then, seventy-five bushels of apples, occupying the same amount of land as 1½ bushels of wheat, 3½ of corn, 17½ of potatoes, and 35 of carrots, estimating these crops at about the highest yield possible. Are not apples ahead? But I am not done yet. Colonel Hannum, a prominent and reliable citizen of Genesee county, says he picked in Massachusetts apples for ten barrels of cider, being eighty bushels of apples, from a single tree, and A. J. Downing, in his Fruit Trees of America, informs us that 121¼ bushels of apples grew on a single tree, in a single season, in the same State. I do not believe there was ever a grain or root crop from the same amount of ground that ever made even a near approach to that, estimating the value of each for food.

I have taken extreme cases; but, comparing ordinary yields, apples still maintain their supremacy. Beets or carrots cannot compete with apples, on account of the great expense of growing them; an ordinary yield of corn is about 35 bushels to the acre, and of apples about 160 bushels, or four bushels to the tree. Here we have four and a half bushels apples to one of corn; fed separately, I think corn is worth the most, but I will give a bushel of corn for four and a half of apples, for the purpose of mixing with grain, rather than feed it to hogs clear, as all animals require succulent food.

When we consider that orchards are generally cropped with grain or roots, and do not really appropriate one-half of the land they are reputed to occupy, the comparison turns decidedly in favor of apples; and when, further, in these times, we bring into the account the great additional expense of growing the corn, all its claims to equality vanish out of sight. Corn, I think, comes nearest being a rival of apples. I compute the actual cost of raising a bushel of wheat to be as great as to raise fifteen bushels of apples.

Let us turn to the growing of apples for market. If a better apple country than Western New York was ever made, I never heard of it. Here the apple tree is hardy and healthy, and the fruit comes nearest perfection. Further north the growth is not free and fair; further south and west, if the flavor is as good, the texture is coarser, and its keeping qualities imperfect. Chicago dealers have a well-known preference for our fruit. Mr. Bennet, of Boston, informs me that New England fruit is failing, and advises us to plant largely of russets, Baldwins, greenings, etc., with full assurance of good prices and an increasing demand.

Let us look at profits. A great majority of orchardists estimate that Western New York trees yield an average of one barrel to the tree, besides culls. The average price on the Genesee Valley canal for the last ten years has been $2 in the fall and $2 80 in the spring. This gives (at forty trees to the acre) $80 per acre in fall, and in the spring $112. The average yield of an acre to grass would not be more than $12 per annum, and of wheat or corn $25 for the same period. Tobacco, hops, the small fruits, etc., with a great outlay of labor, sometimes do as well, but they are an uncertain dependence; they must receive very prompt attention, require many hands, and a great outlay for labor; most of the small fruits are very perishable, and must be thrown upon the market at once, however depressed. However favorable this comparison for apples, I boldly claim that it would be still more favorable if apples received good cultivation; the apple crop might in this way be doubled.

You well know that some trees do remarkably well when they have a fair chance; a tree in Middlebury gave eleven barrels of apples; four trees in LeRoy thirteen barrels each; fourteen barrels were obtained in Bethany, and fourteen barrels Baldwins were taken by Patrick McEntee, of Perry, from a single tree, and sold to A. W. Wheelock for $60. Enos Wright sold from two trees $.00 worth of apples. Two years ago Mr. Hammond, supervisor of Middlebury, sold the product of thirty-three trees of northern spys for $900. Edmund Morris, of New Jersey, the admirable author of Ten Acres Enough (who, by the by, with the usual consistency of preaching farmers, has added thirteen acres to his "ten"), wishing to do some tall bragging, tells of twenty apple trees that produced one year $225. Now I have a story about twenty-two trees owned by Robert McDowell, York, Livingston county, N. Y., grafted nineteen years ago to Dutch pippins, greenings, russets, etc., standing thirty-five to forty feet apart, and sheltered by woods on three sides, the grounds being annually plowed and manured thoroughly—soil sandy loam. He sold from these trees, reserving his culls, in 1865, 163 barrels of apples, for $779 50. Chas. Cronkhite sold the apples, unpicked, on less than four acres for $1,000; they were re-sold for $1,500. S. J. P. Smead, of Bethany, Genesee county, from six acres (soil clay and strong clay loam), sold as follows:

1862	750	barrels	for	$2,370
1863	590	"	"	1,790
1864	600	"	"	2,100
1865	810	"	"	4,500
1866	157	"	"	863
1867, estimated at	600	"	"	3,000
	3,507			$14,623

Add to the above, copied from his income report, apples reserved for family use, and we have 100 barrels to the acre, and two and a half barrels to the tree annually for the whole six years! and paying him annually $400 to the acre. For practical cultivators there is another fact of great significance. This same orchard, after coming into full bearing for some ten years, received only ordinary care, and its returns were comparatively light. It was then heavily manured and plowed shallow, and remained in that state one year, when it was cross-plowed and dragged, and suffered to lie two years longer, and all the time uncropped; then it was manured again and the same treatment repeated. The results I have given you.

S. P. Lord, of Pavillion, bought a neglected, and of course an unfruitful orchard, of seven acres; trimmed, manured, and plowed it, when it immediately commenced bearing, and during the next six years yielded him six thousand dollars. If this is not evidence tending to show that good cultivation would double our orchard products, I confess I do not comprehend the nature of evidence; and yet in my town it is well known that I am a justice of the peace in full blast!

You can read in the New Testament of an ancient cultivator that had got it into his head that digging and dunging a tree might help it. The faults of ordinary management are, first, the impoverishment of the soil, by promiscuous cropping and the withholding of mineral and other manures; second, no trimming, or "bad trimming," which my friend, J. J. Thomas, thinks is worse than no trimming. Trees have a tendency to produce a surplus of wood; if it all remains the branches are feebly nourished, and some die of starvation, after robbing the others. I think that most trees need to be renewed, like grape vines, by an annual and moderate removal of small and superfluous branches, never large ones. I will add that trees, when young, show an inclination to branch low, which, I think, ought to be respected. Low heads greatly favor picking. Mr. Francis, of York, picked from low trees thirty-two barrels of apples in a day. Low branches mulch the ground partially, and in a degree obviate the necessity of plowing.

The third great fault is the omission to fork over the ground, or plow it light, often succeeded by deep and reckless plowing, to the injury of the roots, and often the destruction of the tree. When the ground is regularly plowed every year or two, and at a uniform depth, the roots will establish themselves below the plowing, and if the soil is deep they will do very well. But if cultivation is omitted for several years, the roots indulge their natural habit of running near the surface, and then deep plowing destroys many of the tree's best supports. This is especially so on hardpan and cold, tenacious sub-soils, which drive the roots to the surface. I beg pardon of the pomological society, but I believe the roots know better where to go than any man can tell them. Nature's method of cultivation is by covering the ground with leaves, at once manuring the soil and making it light and acceptable, as no other process can. Mulching, where leaves and litter can be obtained, is a wonderfully cheap and beneficial expedient, and, in my opinion, may well take the place of plowing and the attendant cropping, which has doubtless done much to render a majority of our orchards unproductive.

I am satisfied, by diligent inquiry, that all very large yields come from an unusual amount of nourishment; the tree, by an adroit strategic movement, had backed itself up against a fence, a woodpile, a morass, a barnyard, a building, or something that would shield one side at least from its remorseless plunderer, man, and give it something to eat. A tree in Maryland, standing in the yard near the house of an old governor, bore sixty bushels of apples. The tree described by Col. Hannum, bearing eighty bushels of apples, grew alongside of a swamp where were deep deposits.

I do not recommend large applications of barnyard manure, but a regular supply, and a variety of other fertilizers, including ashes, lime, plaster, charcoal, bone dust, muck, and, better than all, sods and soil from fence corners, roadsides, and forests. The best of our virgin soils are more perfect than any art of man could ever make them. We should beware how we rob them of essential elements by promiscuous cropping.

Whoever embarks extensively in fruit culture should count the cost. He should be determined to watch and destroy insect enemies, supply all needed fertilizers, prune systematically and carefully, dig about his trees, plow shallow, or supply a dressing of leaves or other litter. All the land even in Western New York is not well adapted to apples. Light soils or very tenacious clay should be avoided; a strong clay loam is the best. There is not a great difference in the exposure, but the southeast is preferable in this section.

Maj. Brooks cited Bennett, Rand & Co., and Curtiss & Co., of Boston, and Webster & Co., formerly of Milwaukee, extensive apple dealers, to show the superior quality of Western New York fruit, and especially its keeping qualities. He then brought forward distinguished medical authorities to prove that good apples were "eminently fit to be eaten," in fact should constitute a large portion of our daily food. He read letters which he had received from John H. Griscom, M. D., of New York city, and James P. White, M. D., of Buffalo, certifying that the apple, besides being nutritious, acted favorably upon the "biliary and other digestive functions," was an antidote for dyspepsia and other ailments, and should be supplied in much larger quantities as food for the people. He quoted Dr. Jackson, of Dansville, Dr. Campbell, of Avon, Drs. Hill and Gay, of Buffalo, and Charles Downing, Esq., of Newburg, in favor of the enlarged cultivation and use of apples, and concluded by saying: "The apple, by its unparalleled productiveness, its patience under abuse, its value as food, the small labor required in its cultivation, its high price in market, and the remarkable adaptation of our soil and climate to its growth, is worthy of more extended cultivation."

APPLE REPORT FROM HANNIBAL, MISSOURI.

Report of the flavor, hardiness, thrifty growth, regular bearing, and profit of O. H. P. Lear's apple orchard, near Hannibal.

No. 10 being the best, No. 5 medium, and No. 1 the poorest, in the scale below adopted.

VARIETIES.	FLAVOR.	HARDINESS	THRIFTY GROWTH.	EARLY BEARING.	REGULAR BEARING.	PROFIT.
Ortley, or white bellflower, always in demand	9	10	9	7	8	10
Rawle's janet, the standard	7	10	6	7	7	10
Winesap, the standard	8	10	7	8	10	10
White winter pearmain, very salable	10	10	8	5	6	8
Swaar, extra flavor	10	1	5	8	4	2
Yellow bellflower, fine when you get it	10	10	10	1	1	1
Smith's cider	7	10	10	7	8	8
Northern spy	10	10	10	3	5	3
Pryor's red	10	4	6	2	4	2
Small romanite, or Gilpin	5	9	8	6	9	6
Pennock	5	10	10	6	7	7
Cannon pearmain	6	4	6	4	4	2
Gold gate, or Belmont	10	4	5	4	5	3
Fream. red	6	10	10	8	9	5
Peck's pleasant, extra fine	10	3	10	6	5	3
Milam	7	9	8	8	7	7
Baldwin	9	5	8	5	5	4
Rhode Island greening	10	5	7	5	5	2
Green winter sweet	7	5	5	5	5	1
Winter sweet	7	10	10	5	8	4
Willow twig	5	8	10	6	7	5
Paradise sweet	10	7	6	4	3	4
Ladies' sweet	9	10	9	4	4	2
Newtown pippin	10	7	5	4	5	4
English redstreak	9	5	5	4	6	5
Seek-no-further	9	5	4	5	3	2
Roxbury russet	8	6	5	5	3	2
Esopus Spitzenberg	9	2	3	3	3	2
Yellow winter pippin	9	7	4	5	5	3
Virginia greening	8	4	6	5	6	4
FALL LIST.						
Maiden's blush	10	10	10	8	7	10
Rambo	10	9	8	7	8	8
Red gilliflower	9	10	10	5	4	1
Gravenstein	8	10	10	5	4	4
Pound pippin	9	2	5	5	8	3
Small pearmain	8	7	6	5	8	6
Western red	6	5	5	8	5	5

REPORT OF O. H. P. LEAR'S APPLE ORCHARD—CONCLUDED.

VARIETIES.	FLAVOR.	HARDINESS	THRIFTY GROWTH.	EARLY BEARING.	REGULAR BEARING.	PROFIT.
Carthouse	5	10	10	5	7	5
Fall queen, or Turner's queen	8	6	7	5	5	5
Fulton strawberry	10	5	5	5	7	5
Porter	10	8	8	5	8	8
Turner's redstreak	6	5	4	5	7	4
SUMMER LIST.						
Prince's yellow harvest	7	9	7	8	7	10
Red June	6	9	9	9	10	10
Early Margaret	5	8	6	5	5	5
Summer pearmain	6	7	8	5	4	5
Summer queen	8	10	10	4	4	5
Sweet bough	5	10	10	3	2	1.

My oldest trees have been bearing about fifteen years, and a large portion of the above lists are of the first and second setting, so that my experience is of at least ten years' duration. I have a number of varieties not yet in bearing. In summing up the "profit" column reference is had, not to the value of the fruit alone, after it is ready for market, but the general productiveness of the tree itself is also taken into account. The northern spy is put down as *best* in quality of fruit; tree *thrifty and hardy;* very late coming into bearing; an average bearer; but the fruit drops very early, and also rots badly on the trees, so that very few specimens ever get to market in good condition.—O. H. P. LEAR.

HOP GROWING.

Increased demand for hops—Progress of hop-growing in Wisconsin and profits realized—Hop plantations in England—Can hops be made profitable in connection with the dairy? etc., etc.

The increase in the use of malt liquors throughout the United States during the past few years has been so large as to arrest the attention of the most common observer. The causes have been variously accounted for. Some contend that the influx of foreign population, more especially the German element, has had an important influence in stimulating the manufacture of different kinds of beer, and educating native born citizens in the use of this beverage. Others contend that the high tax on alcoholic liquors by enhancing their value or cost has had the effect of reducing the consumption among the common or poorer classes, and who have taken to the use of a less stimulating beverage at a more moderate expense. But whatever the cause may be the fact is patent that there has been an enormous increase in the demand for all grades of malt liquors, and this has created an increased demand for the materials from which they are made.

The demand for barley and hops has been steadily on the increase, and it is thought by many that the demand for years to come will be so great as to insure most remunerative prices to the producer.

The best manner of cultivating hops is not generally understood among farmers outside the hop districts, and the constantly increasing demand for hops has not attracted general attention. A large proportion of farmers, not acquainted with hop culture, when hearing of the high prices paid for hops have supposed these extreme rates the direct result of the damage and destruction of hop plantations by the aphis or hop louse. They have not taken into account the increased production of malt liquors and the increased demand of the material required in their manufacture. We do not underestimate the influence upon prices which a failure in a portion of the crop may have, but it should be understood that increased demand and consumption must rank hop growing among the most profitable branches of agriculture in this country.

According to the census of 1840 the product of hops in the United States was but 1,238,512 pounds; in 1850 it had increased to 4,497,029 pounds; in 1860 the product was nearly 11,000,000 pounds, and this year, 1867, it is estimated to reach 20,000,000 pounds, or 100,000 bales, of which 50,000 bales are credited to New York.

Next to New York Wisconsin holds a prominent place as a hop-producing State, her crop this year being estimated at 35,000 bales, or 7,000,000 pounds. In Sauk county, which has a large German population, the crop this year is 20,000 bales, or 4,000,000 pounds. Dealers tell us that the Wisconsin hops are excellent, the vines being for the most part free of disease.

To show how rapidly this branch of farming has been carried on in Wisconsin, we might mention that the crop for 1865 was only 829,317 pounds, of which Sauk county produced 522,208 pounds. The crop in Sauk in 1866 was 1,500,000 pounds, and it is estimated that Sauk county next year will have 5,588 acres in bearing. The hop growers in Sauk realized this year $2,000,000 for their crop, which is a most extraordinary sum to be taken from a branch of farming so comparatively new in that section.

A recent number of the Chicago Times makes a detailed statement of the receipts, expenditures, and profits realized by some of the Sauk county hop growers, which will give our New York hop growers some idea of what is being done by their brother farmers in the West. The account is of one of the yards belonging to Mr. Howard H. Potter, of Baraboo, containing four acres, since it commenced bearing, as follows:

CAPITAL INVESTED.

Mr. Potter counts as capital invested his drying house, his press, his hop poles, and other necessary fixtures:

7,000 tamarac poles, at $90 per m.	$630 00
Drying house, 20x40	400 00
Store, pipe, press, and boxes	125 00
Total capital, exclusive of land	$1,155 00

The land is worth some $200 per acre, not more.

FIRST YEAR'S CROP.

The yard came into bearing last year (1866), and the crop was sold at fifty cents per pound. The following is the detailed statement of the cost of production, the sum received from the sale of the crop, and the profits realized:

Cultivation, setting poles, and tying vines	$85 00
Harvesting, drying, baling, fuel, and sacking	767 00
Man and team ten days, drawing manure	40 00
Fifteen per cent. for depreciation of capital intested in hop house and other fixtures	168 00
Total expenses	$1,060 00
Received for 9,320 pounds hops, at 50c	$4,660 00
Deduct expenses	1,060 000
Leaving as profits for crop of 1856	$3,600 00

FIRST CROP OF HOP ROOTS.

The next spring following this crop it was necessary to remove the surplus roots, or runners, from the yard (the reason and manner of which I will hereafter describe); and these roots being in great demand to set out new yards, they were sold, some few at $10 per acre (what are necessary to plant an acre is meant), some few at $15 per acre, but most of them at $20 per acre. The roots taken up from these four acres

Actually brought	$3,140 00
Deducting for expenses of taking up and marketing	100 00
Total profits for roots sold	$3,040 00

Mr. Potter is sanguine that these figures will be increased another year, as he will have a larger number of roots to dispose of, and the orders already being received by mail seem to indicate a still stronger demand than existed last year.

THE SECOND OR THIS YEAR'S CROP.

This year's crop was more bountiful than last year; but the exact number of pounds picked cannot be definitely ascertained,' as the hops are not all yet baled, and cannot be conveniently weighed. There were, however, from this same yard of acres, 1,124 boxes of hops taken, which, at the average of 10½ pounds per box, would yield 11,802 pounds of hops; and, as it is certain that the boxes would average over rather than under 10½ pounds each, I accept it as a basis, and call the crop 11,802 pounds. This amount I charge up at 55 cents per pound, because that has been the leading price paid by dealers here this season. That I am within bounds will be apparent when I state that 58 cents has been offered for them and refused; and that, when sold, owing to their being extremely choice, they will probably bring 60 cents, unless there should be some sudden reaction in the market, which does not now seem probable. These figures give us the following results:

Cultivation, etc.	$100 00
Harvesting, cutting, etc.	943 00
Fifteen per cent. for depreciation of capital	168 00
Total expenses	$1,211 00

Eleven thousand eight hundred and two pounds of hops at 55c	$6,491 00
Deduct expenses	1,211 00
Leaving as profits for crop of 1867	$5,280 00

RECAPITULATION.

Profits of crop of 1866	$3,600 00
Profits on crop of hop roots sold in spring of 1867	3,050 00
Profits on crop of 1867	5,280 00
Total	$11,920 00

Representing the profits, over and above expenses incurred in production and marketing, taken from four acres of ground in the space of fourteen months, embracing the crops of two seasons.

These figures seem startling, but can be relied upon, nevertheless. It should be borne in mind, however, that Mr. Potter succeeded in obtaining an extraordinary large yield, but still not larger than any one else of equal experience could obtain with the same care. Prices, also, have been very high during the past two years. It will be interesting to consider, however, that had prices this year and last been but thirty cents per pound, Mr. Potter would have realized a clear profit of $1,736 last year, and this year $2,329; which, to say nothing of the money realized by the sale of hop roots, would pay any farmer handsomely for the results obtained from but four acres of his land.

It appears that the Wisconsin hop plantations have not as yet suffered from the diseases and enemies of the plant which have of late years so largely prevailed in New York. Toward the latter part of the past season the louse made its appearance, but without doing much damage. It is not improbable, however, that next season the vines will be attacked in the same way as in Otsego county, in this State, and a check given to this most profitable branch of farming in Wisconsin. The hop louse is a most remarkable insect. The eggs from which they are hatched are laid in the autumn and the next spring the insect appears. The whole brood, it is said, without a single exception, are females, and wingless. They mature in a very short time, and are in a condition to continue their kind, which are not, in their case, hatched from eggs, but produced alive, and each female may be the mother of from fifteen to twenty in the course of a single day.

The second generation are also females and wingless, which grow up and have their young in due time, and thus brood after brood is produced without the appearance or intermingling of a single male. In the autumn a brood of males and females is produced which acquire wings and pair. Eggs are then laid by the females, and thus a succession of the species is secured. In selecting the location for the hop, one great point to be secured is that the land be not naturally wet, or where water accumulates and stands after rains. The best hop gardens in Kent, England, are thoroughly underdrained. A considerable portion of the soil in Kent rests upon the rag-stone, a rock broken with numerous and deep fissures, and of a crumbling nature, presenting a good natural underdrainage.

Upon this soil there are hop yards more than a hundred years old, the vines still presenting a healthy and vigorous appearance, with no signs of failure. Another requisite sought for is a spot where there is a good circulation of air without being so much exposed as to be liable to have the hops damaged by high winds. A clay loam or good fruit land is regarded as most suitable to the plants, although the hop will grow on sandy soil.

Were it not for the prevalence of the aphis or hop louse, small plantations in connection with the dairy could be made most remunerative. The hop requires liberal manuring, and it would seem almost imperative that stock should be kept upon the farm in order to supply this material in sufficient quantities.

In England, besides farm-yard dung, wool, hair, bones, plaster, lime and ashes are used largely as fertilizers. The hop growers of Kent calculate upon spending from forty to fifty dollars per acre for special manures in addition to what is ordinarily made upon the farm. We do not understand that special manures have been used to any great extent in the hop regions of New York. To those living in the neighborhood of cities and villages large quantities of refuse fertilizers can often be obtained at cheap rates, and could be profitably employed for hops, and we do not see why this crop should not be made most remunerative upon farms suitable for its culture in the neighborhood of towns where the refuse of tanneries and woolen manufactories can be had.

An objection with many to growing hops is the expense necessary in polling the yard and erecting suitable buildings for curing the crop. Somewhat recently, inventions have been made to take the place of poles in the yard, thereby doing away with a large proportion of the expense in fitting up a plantation. The most popular of these devices is that patented by Mr. Collins, of Otsego county. We have talked with a good many hop growers, both in this country and in England, and have generally found their testimony in favor of poles as producing a better crop; yet, considering the great difference in the expense, it is a question whether the Collins method of training the vines might not be profitably adopted when the cost of poles is considered.

It is not to be expected that the price of hops will remain at the present rates for any great length of time. The profits are so enormous that the production will be stimulated in new districts; so that in time the quantity grown must reduce their value to more moderate rates; yet the price for years to come, it is believed, will be highly remunerative. In view of these prospects, the question presents itself, whether small hop plantations, say of an acre or two, upon dairy farms having suitable soil and location, would not be advisable.

There are hop growers in Oneida, Madison, and Herkimer, who have made their fortunes in growing the crop, and who are to-day clearing more money from a few acres of hops than from large dairies. It is true there are some objections to the crop, and some considerable risks to be taken into account with those commencing the business. All these should be well considered. The subject is one which may well occupy the attention of dairymen, and we should be glad to have the views of correspondents touching the matter, either for or against it.—*Utica (N. Y.) Herald.*

SORGHUM AND ITS PRODUCTS.*

This is the title of a new and important work upon this subject, and as it is throughout the embodiment of the results of original researches, and contains information of the highest value to the planter and manufacturer, we here give, with the consent of the author, a brief synopsis of a portion of the work, or condensed extracts from different parts of it, hoping that public attention—and especially the attention of western agriculturists—will thereby be more fully aroused, and that they will be led to a careful study of the book itself, and of the processes and appliances which it so fully describes.

It is hardly necessary for us to express the opinion that the production of either sugar or sirup from sorghum, by the ordinary means, is not likely to become a permanent branch of industry. The statistics of the subject, the inferior quality of the products, and the opinion of intelligent manufacturers everywhere, who are dissatisfied with the common modes of working, are conclusive upon this point. The publication of this work is opportune, and while the author does not attempt to disguise the difficulties in the way, he shows how they may readily be overcome. A connected system of operations is pointed out, which is based upon the nature and requirements of the growing plant and the chemical constitution of the juice, and amply verified by experiment. Thus uniformity is secured in the results, and the products of the manufacture assume at once a recognized standard value in the markets—their tendency to fermentation and decomposition is destroyed, the harsh flavor of the plant is removed, and there is no reason why the sugar grower of the West may not compete favorably with the Louisiana planter. In this view the subject assumes a new importance, and our interest in it becomes increased, when we find that the plant itself is much more valuable than has been commonly supposed; when we compare it with other sugar plants, and particularly with the sugar cane grown in our Gulf States. We quote from the author's preface:

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*SORGHUM AND ITS PRODUCTS: An Account of Recent Investigations Concerning the Value of Sorghum in Sugar Production, together with a Description of a New Method of Making Sugar and Refined Sirup from the Plant. Adapted to common use. By F. L. STEWART. Philadelphia: J. B. Lippincott & Co. 1867.

"One fact, however, rewards the investigator at the start, and was to me a sufficient encouragement, namely, that *the best varieties of this cane contained as large a proportion of crystallizable sugar as does ordinarily the sugar cane in Louisiana.* This truth has not generally been recognized, but the sooner it becomes known and appreciated the better."

This bold announcement will be found to be fully supported by experiments and analyses, the results of which are given throughout the volume.

In the historical sketch of "Sugar and Sugar Plants" (chap. 1), the different kinds of sugar are pointed out (more particularly characterized in chap. 27), and the fraudulent character of any attempt to introduce, as a substitute for cane sugar, the kinds variously known as grape sugar, corn sugar, starch or potato sugar, etc., becomes evident. The latter are "entirely different from true cane-sugar, and can never be substituted for it in domestic use. They are soft, mealy, and liable to become damp and to ferment. They curdle milk, and are inappropriate for sweetening tea or coffee, and for most culinary purposes. In saccharine richness this kind of sugar is far inferior to cane sugar, two pounds of the latter being equal in sweetening properties to five of the former."

Of the many plants which contain cane sugar, there are four sources only from which, in this country, it is found in sufficient quantity to render its manufacture profitable. These are the southern sugar cane, the northern maple, the beet, and sorghum. The inadequacy of the sugar cane of the South is shown from the narrow geographical limits to which its cultivation is necessarily restricted. The supply from the maple is precarious, and at best very limited. The beet, although capable of being grown here largely, is objectionable "on account of the great expensiveness of the machinery used in the production of sugar from it—the radical changes which its cultivation would inaugurate in the means and methods of agricultural labor already existing, the inferior quality of the secondary products," etc. Moreover, the beet can never be used as a sugar-producing plant in some of the most favorable regions for its growth as to climate and soil, because its juices cannot be kept from destruction where the winter temperature is so mild that the stored beets will sprout.

Sorghum cane, by reason of its intrinsic value as a sugar plant, and its peculiar adaptation to our climate and soil, and, in the main, to a mode of culture to which our people have become accustomed, has a hold upon our regard, which is entirely separate from that arising out of any circumstances befitting it to meet a temporary want at the time of its introduction.

METHOD OF CULTIVATION (*Chaps. II, III, IV, V*).—This differs from that ordinarily pursued. The rule so much in vogue of planting and cultivating cane the same as Indian corn is shown not to be a safe one to be followed, by reason of certain natural peculiarities in which these plants widely differ, and which are pointed out. One remarkable characteristic of sorghum cane not heretofore practically recognized, is shown to be worthy of marked attention, and to lie at the foundation of every natural system of culture, as applied to this plant. This important distinction consists in the fact that sorghum, like many of the true grasses, but unlike most annual plants, does not maintain a symmetrical development of its parts, or of the stem and the root; on the contrary, it accumulates at times in special parts of its structure newly-organized matter, from whence it is distributed at other periods with great rapidity to those parts to which the vital energies of the plant are suddenly, but in a uniform manner, diverted. This peculiarity is exhibited in a remarkable way in the accumulation of the nutritive matter in the root, during the period of early growth, while the green parts of the plant are almost dormant, and afterward in the rapid transfer of this stored nutriment to the stem, at which time the latter shoots up with a rapidity unexampled in plants of a temperate clime.

A strong analogy is manifested between this mode of development and that of our winter grains, and a mode of cultivation founded upon it is recommended, which is as closely adapted to the requirements of the plant as the peculiarities of the season, during early spring and summer, are found to warrant.

It is impossible to define, within the brief space here allotted to the subject, the reasons why the details of this system of culture receive such prominence, and are so earnestly insisted upon by the author. We can only say that, throughout, the mode of culture and the choice of soil and season seem to be adapted to well-marked physical requirements, and the system, therefore, is pre-eminently a natural one, and when the nature of this plant is fully understood, will commend itself to the practical good sense of the planter. Especial importance is attached to, 1st, fall plowing, and deep and thorough tillage; 2d, very early planting; 3d, ridging.

Fall plowing is insisted upon for various reasons. It is essential to early planting; it enables the planter to select favorable weather in the spring for depositing the seed. The work of preparing the soil can be better done during a season of comparative leisure in the fall; and when the soil is in good condition for being broken up it secures the powerful mechanical aid of the frost in producing thorough pulverization, and that light, open, aerated character of soil which is necessary to the health of this plant, and the growth and nutrition of its deep and wide-spreading rootlets. In sward land, it is doubly necessary to promote rapid decomposition of the sod, and to destroy noxious insects.

Early spring planting is advisable, because it is conformable to a habit of growth (already briefly alluded to). Ripening is secured at a much earlier and more favorable period. It necessitates fall plowing and assigns the work of turning the soil to a time when it can be well done. Germination of the seed is permitted to take place at a congenial period, and anticipating a season of prolonged drouth, which often commences late in the spring. Gypsum, a highly valuable fertilizer to this cane when young, is but very sparingly soluble in water, and as it acts only in the dissolved form, a large supply of moisture, prevalent during early spring, is necessary to the exercise of its proper influence. The fact that early spring planting only is possible in northern China—the original source of the cane most popular in this country—strongly indicates the propriety of adopting the same practice here. (*Chap. XXX*).

Ridging of the ground is necessary, as connected with early planting, and secures several important advantages, among which are drainage during the wet season, when the growth of the young roots is in progress, and with thorough drainage, all the recognized benefits arising from it; also, a more perfect aeration of the soil in contact with the roots is effected, since land thrown in ridges exposes a larger surface than when flat. Evaporation is promoted, and the land brought into a cultivable state much sooner. After wet weather the young cane grows more rapidly and vigorously; for, being upon the crest of a low, broad ridge, it has the advantage of elevation over weeds that spring up around it, and receives more light and air. The growth of weeds, moreover, is more effectually prevented by the superior advantages for early cultivation afforded by this mode of planting, since by following the ridge the surface may be stirred by the plow or other implement, to kill weeds, before the cane is up, if necessary.

The after culture is conformed to the foregoing general features of the system, but cannot be described here in its details. Before the cane is up, or at the time it makes its appearance, a horse hoe or cultivator, with the blades shortened on the side next the ridge, or shovel plow, is passed between the rows, stirring shallowly the soil of the ridge, as close to the crest as possible, without disturbing it. Next, a corn plow is used, to throw fresh soil toward the ridge, thus broadening without elevating it. Then the cane is thinned out, if necessary and hand hoed; and finally, at a certain period, it receives the last plowing; fresh soil being thrown toward the cane as before.

"A vertical cross section of each ridge at that time presents only a slightly convex outline, with a broad shallow, drain between it and the contiguous ones. The objection commonly urged against the ridging of land for corn does not apply to this mode of treating the cane, inasmuch as undue evaporation during the heats of summer is prevented by the condition in which the surface of the cane field is left at that time."

Manures (*Chaps. VI, VII*).—A knowledge of the influence of different fertilizing materials upon the growing cane is of the utmost importance. They may be divided into two classes, viz: those which at certain stages of growth are essential to the nourishment of the plant, and those which are either inert or wholly injurious. Prominent among the former, when judiciously applied, are lime, potash, soda, and magnesia, combined with phosphoric, sulphuric, carbonic, and hydrochloric acids. Among those that are positively injurious are all substances rich in nitrogen, applied directly to the cane, including animal manures of all kinds, and ammoniacal salts. "No fact connected with the culture, either of sorghum or of the tropical cane, has been more clearly established by the experience of planters than that manures of animal origin are not only injurious to the quality of the sugar, but present great obstacles to its formation, when called into action during the middle and latter stages of growth." The formation of a large excess of gluten, albumen, etc., in the juice, is also the inevitable result. The only exception to the harmful influence of the application of such manure to the cane is when it is applied sparingly as a top dressing, during the early period of growth, or during that stage of its existence immediately succeeding the germination of the seed. Of all fertilizers, gypsum, or sulphate of lime, is probably the most efficient. Sulphate of potash, also, may be employed with great advantage. The begasse, or cane trash, is one of the most useful substances, when properly applied; but, for the rationale of its decomposition, and the best modes of using it and other fertilizers, we must refer the reader to the extended account in the book itself (pp. 46–61).

SOILS (*Chap. VIII*).—The relative value of different soils in sugar production is a matter of great importance. "The soil is not merely a repository of the food of plants. The texture and other physical properties of soils generally have a no less important influence upon their fertility than those that are strictly chemical." * * * * Correspondent to the qualities of the soil, the juice of the cane undergoes, uniformly, various degrees of modification. A deep, mellow, light, calcareous loam is the soil preferred. "Such soils are abundantly distributed throughout the whole district where sugar production would be profitable, and especially on the uplands of the western States. They are very largely developed where the great series of limestone rocks, from which they derive their chief characters, is found." We have room only for the insertion of an extract from this chapter, showing the superiority of some of our Missouri soils for cane growing. If our farmers need any additional incentive to exertion in advancing this enterprise, they will find it, we think, in the unequaled advantages of soil and climate combined, which we possess.

"Among these western soils particular prominence should, however, be given to one of a peculiar character, consisting of an extensive bed of a fine, friable, silicious marl, of a buff color, which is found to cover to a great depth those picturesque hills on the banks of the Missouri river and of the upper Mississippi, called "the bluffs," from which the deposit itself derives its name. It is most largely developed along the valley of the lower Missouri, and extends over wide areas of the elevated country, on either side, forming the surface of the richest upland prairies; often, however, it is covered with heavy timber. * * The soil formed from it contains, in its natural state, a very large proportion of vegetable matter derived from the forests, which, in many places, still continue to clothe it with almost tropical luxuriance. Indian corn, tobacco, or hemp, should be grown upon the recently-cleared land for three or four successive seasons, until the vegetable matter has been completely decomposed and incorporated with the soil, and its tendency to promote too rank a growth of cane subdued. After this preparation it is difficult to imagine in what respect it could be improved for sugar production from this cane. Its chemical composition, texture, and great depth, its evenly rolling surface, topographical elevation, and thorough drainage, comprise advantages such as, it may confidently be said, are naturally possessed in the same degree by no other soil in the Union for this purpose.

CLIMATE (*Chap. IX*).—The important subject of the influence of climate, as well as other topics discussed in several chapters immediately succeeding this, must be passed over in the most cursory manner. It will be seen that the climate of Missouri also falls within the isothermal belt most suitable to sugar production. "The line of 70° equal summer heat marks the northern range of sorghum as a sugar-producing plant; * * * but the growth of the cane is more vigorous when the summer line of 72° F. is reached. The line of 72° crosses the State of Delaware, going westward, extends through Central Maryland into Virginia, where it passes up the Shenandoah valley, being sharply deflected southward to the mountain chains; thence through Western Virginia, Southern Ohio, Central Indiana, Illinois north of Springfield, and Southern Iowa. North of this line the period of growth is necessarily extended, and the summers are gradually shorter and cooler as we approach the line of 70°." * * * "The future sugar district of the United States, instead of being limited to a narrow border along the Gulf of Mexico, may now be defined to be a great continental belt of irregular outline, having for its northern boundary the summer line of 72° Fahr."

MEANS BY WHICH THE MATURITY OF CANE MAY BE HASTENED (*Chap. X*).—" By pursuing the system of planting and cultivation above recommended, and making use of other means specially directed to this end, the ripening of Chinese cane may be hastened from thirty to fifty days."

The selection of the earliest ripened seeds from large, healthy plants—early planting in connection with fall plowing, early culture not too long continued, drainage by ridging, planting in warm lime soils, in an elevated situation, with a southern aspect, the cane rows running north and south, " are to be relied upon as the most efficient means of shortening the period of growth."

THE TILLERING OF SORGHUM (*Chap. XI*).—The nature of the tillering process, or suckering of sorghum, is fully discussed, and the conclusion is reached, deduced from experience and observation, that "tillering is a natural process, conducive in a high degree to the health and vigor of the plant." When the mode of treatment above recommended is adopted, the production of side shoots is not injurious to the quality of the juice, nor sensibly retards the maturity of the cane; while the yield by means of them is largely increased.

THE HARVESTING AND STORING OF CANE (*Chaps. XII, XIII*).—The subject of these chapters cannot be epitomized. We merely advert to the fact that the operation of stripping cane is stated to be most easily performed in the field upon the standing cane, "by means of a kind of wooden sword, double-edged, about three and a half feet long, and in shape like a long skutching knife, used by flax dressers." The operation of "topping" is thus performed: "The two upper blades of the cane are not removed in stripping, and they serve as a guide to the eye of the workman, who arranges the cane in bundles upon a block as it is received from the wagon, and the topping is done with a carpenter's broad ax with great rapidity and nicety."

PROCESS OF MANUFACTURE (*Chaps. XIV, XVIII*).—"Among the distinctive features of this process are the following:

"1. A method by which the crystallizable sugar in the juice is separated from the impurities, which prevent its assuming the crystalline form. This consists in the use of a chemical compound which has not heretofore been applied for the defecation of sorghum juice.

"2. A new mechanical device to effect the separation of the scum containing the green matter, feculencies, and coagulated impurities without the loss of time, the labor, and the inconvenience which has hitherto attended this part of the work.

"3. A means of depriving the sirup of the harsh, vegetable taste common to it, without the use of the expensive and inconvenient appliances regularly employed by the refiner. The sirup is thus cheaply refined at once during the regular progress of the evaporation.

"4. The employment of a finishing pan of such construction and form as to permit the evaporation of the sirup to be protracted to any required degree, without danger of caramelizing the sugar, which may be instantly removed from the action of the heat when the proper point of concentration is reached, as indicated by a thermometer, and discharged by dumping it into a cooler, thus affording the means of making readily a pure sirup of perfectly uniform density, or of reducing the sirup to the point of density at which crystallizable sugar may be obtained of the best quality and in the greatest abundance."

"The above are inseparable and indispensable parts of this process, and have been found to be requisite to uniform success in the manufacture either of sorghum sugar or of a superior quality of sirup."

"The means used" (for the purposes above named) "must be well chosen. They must be adequate; they must be of such a kind as to be adapted to ordinary use on the large scale; the defecating agents must be harmless to health if inadvertently added in excess to the juice, and must leave no harmful compounds in any product which is afterward to be used as an article of diet; they must be sufficiently convenient in form and low in price, and they must not exert an injurious influence upon the constitution of the sugar." * * * * *

"Ripe sorghum juice, as it flows from the mill, is an impure solution of cane sugar. It commonly contains a small but somewhat variable proportion of grape or fruit sugar, also. Other substances, also, in less quantity, are either dissolved or mechanically suspended in the liquid. The chief of these are *chlorophyl* (or the green coloring matter), starch, dextrine (gummy matter), vegetable tissue, pectine or vegetable jelly, vegetable albumen, gluten, and casein (the last three containing nitrogen), acids, salts, and extractive matter. Other modifications of these are found in sirup, and are secondary products, and are not contained in the raw juice. Liquid sugar is an example. It is a degraded form of cane sugar, perfectly uncrystallizable, and is produced by the action of heat and imperfect processes of manufacture"

"The cane sugar cannot be induced to crystallize while any considerable quantity of the substances with which it is thus associated is present in the solution. To break this alliance is, then, the great desideratum, and, as already stated, the merits of this system of manufacture will be found to consist mainly in the high degree of completeness, ease, and economy with which this is done. The means used, both chemical and mechanical, have been studiously adapted to each other and to the end in view."

What these are we shall attempt to describe in as condensed a form as possible.

CHEMICAL AGENTS USED IN DEFECATION.—Pure quick-lime is used preferably to soda, potash, or other bases to saturate the free acid in the juice. The reasons why it is preferred, and the rationale of its action, are interesting, but cannot be briefly described. The acid being saturated albumen and tannin, associated, a definite proportion of alumina are added to the cold juice. The peculiar action of these substances follows immediately upon the action of heat. A reaction takes place, and a new group of substances is instantly formed, all of which, upon the application of heat, become insoluble. The alumina has a powerful attraction for the coloring matter which it takes up and unites to itself in the insoluble form. The tannin unites with and removes all the glutinous, mucuous, and gummy substances in the juice. These substances are found in the juice of the southern cane, also, but they are always associated in it with tannin, and when heat is applied they unite with it and are removed. There is no tannin in sorghum juice, and in this case that is added to it artificially, which, in the case of the southern cane, is supplied by nature. Nothing else can innocently be employed to effect the same purposes as tannin.

Albumen is added chiefly to give greater buoyancy to the aluminous compounds formed, and bring them to the surface. These added substances, and all those which they are designed to remove form insoluble compounds, are instantly removed with the scum when the juice is admitted upon the heated surface of the evaporating pan. Thus, with far better results than by the use of any *precipitating* process, the separation is effected at once. No precipitating tanks are needed, and the loss of time and labor attendant upon their use avoided. The substances employed are cheap, readily used, are not in any respect injurious, and conform to all the conditions required.

APPARATUS EMPLOYED IN THIS PROCESS.

1. *An evaporating and refining range*, represented in the engraving (see frontispiece). M is a wooden tank, divided into two compartments, to receive the fresh juice from the mill. In it the juice is mingled with the defecating agents, and discharged from each compartment alternately into the evaporator in a continuous stream. The evaporating apparatus consists of four sections—A, B, C, and D—placed over a straight flue of brick work, in a descending range, the pan A being the highest in the series. The first three are stationary; the fourth, D, is movable on a horizontal axis. The cooler is simply a large shallow wooden box of the shape represented in the engraving. It may be mounted on a truck, and at the close of each day's boiling may be run along a tramway into the draining room and emptied.

The simple and effective manner in which the classification is accomplished in the pan A, where the boiling juice itself is made to do the work of skimming, may be seen at a glance. From the back part of A two abutments or ledges—S S—extend along the bottom of the pan toward the front. This pan projects over the side and front of the furnace walls, and the thin ledges or abutments are placed so as to stand directly over the inner face of the side walls and terminate just over the end wall of the furnace. The bed of boiling juice in A is very shallow—it can boil only over the central heated space—and the cold juice flashes into foam almost as soon as it touches that surface. It immediately throws up its scum, which, on account of the elevation of the boiling surface, falls first toward the front of the pan, and backward into the bays B B, where it is kept packed in by the propulsion of the boiling, and is dipped out or run off by the operator at intervals of fifteen or twenty minutes. Thus the labor, loss of time, and inconvenience of skimming are avoided. The clarified juice is further evaporated in B, and then passes into C, through the filter B, which is a shallow cistern containing animal charcoal prepared expressly for this use. The effect of this filtration, assisted by the previous clarification, is almost magical—every trace of sorghum flavor is removed, the sirup is bright and glassy, and its flavor resembles strongly that of new maple sirup. *It is thus cheaply refined at once.* The revivification of the bone charcoal is accomplished by inclosing it in a cast-iron cylinder (not indicated in the engraving), which is placed horizontally in the floor of the evaporator furnace itself. The cylinder may be revolved occasionally, so as to expose its contents equally to the heat, by means of projections at its ends, outside of the furnace walls, where, also, there are openings, closed by slides, through which to fill and empty it.

In the finishing pan, D, the evaporation may be protracted to the required degree without danger of burning the sirup. A thermometer immersed in the boiling sirup at the side of this pan indicates by the temperature of the boiling point the exact density of the sirup, and the proper instant for its removal from the heat.

This evaporating range, in all its parts, is adapted to meet all the main difficulties that in this manufacture have heretofore stood in the way; it is especially conformed to the new process, is simple in form, efficient in action, cheap and durable, economizes fuel, and evaporates with great rapidity.

2. *A steam centrifugal sugar-drainer.* This lately invented machine renders unnecessary the slow and imperfect method of separating the sugar from the molasses by natural drainage, and is a great improvement upon the centrifugal machines used in the sugar estates of Cuba, or that have been introduced into this country. Steam applied in a simple and beautiful manner furnishes the motive power, and maintains a proper temperature in the mingled mass of sugar and sirup, acted upon when introduced into the revolving drum; so that the sugar is left dry and very fair, because the sirup is almost instantly and totally expelled. The work is thus done far more efficiently than by any other mode; neither muscular force nor any expensive or cumbrous motive power is used. The machines, when complete, can be made of any required capacity; but such as are adapted to farmers' ordinary use, need not occupy more space than a common portable cider mill, nor cost more, requiring the attention only of one person during the course of a day's work. We regret that an engraving of this new drainer could not be obtained in time for insertion here, without which a description of it would be useless.

3. *An improved crushing-mill* for grinding cane. Having proved to his own satisfaction the inefficiency of most of the sugar mills commonly used (see an extended account of experiments in chap. XIX), our author suggests certain improvements in the construction of this important part of the machinery. Adopting these suggestions, and adding to them other features not there indicated, but which since the publication of the work have been found to be important, he has invented and is about to introduce a mill which he will warrant to express seventy-five per cent. of the weight of the stalk of the cane in juice, while ordinary mills extract but fifty per cent. on an average. We ask our readers to examine carefully the chapter on Sugar Mills (XIX), above referred to.

We understand that it is the intention of Mr. Stewart to introduce his process and the machinery above referred to into the south, for manufacturing sugar and refined sirup from the southern cane as well as sorghum, thus rendering vacuum pans unnecessary, improving the quality of the products, reducing vastly the expense, and putting this industrial pursuit within the reach of persons of moderate means. The evaporating range is well adapted, also, to the manufacture of sugar from the beet and the northern maple. Orleans molasses and crude, fermented sorghum sirup, also, may be readily and cheaply refined by this process, and their value more than doubled.

We have room only to insert the titles of the remaining chapters of the book. They are descriptive of "The chemical action of substances used in defecation," "Animal charcoal or boneblack," "The action of heat," "Other methods of mauufacture," "The common method by heat," "Sugar making at home," "The value of sorghum in sugar productions," "How to test cane juice," "Comparison of southern cane and sorghum," "Natural affinities of these canes, and inferences derived therefrom," "Other products."

CULTIVATION OF BROOM CORN.

An extensive inquiry among the broom factories of St. Louis, develops the fact that, of the four to five hundred tons of broom corn used in the city for the manufacture of brooms, only about forty tons are grown in Missouri, the remainder coming mainly from Illinois; and yet all agree that the growth of the former State is a much more desirable article than the product of the latter, there being a greater proportion of what is called "hurl" brush, and the brush being finer, yet not so fine as to make the broom weak. This difference arises from the difference of soil—the sandy loam of the bottom lands of Missouri, which have been heretofore cultivated, being admirably calculated for the crop. As a general thing, a growth of head ranging from twelve to eighteen inces in length is really the most profitable to the manufrcturers; yet for "hurl," or those brooms which are made from the brush without any of the stock being used under the wire, and which are the most desirable brooms, a longer growth is necessary, say from twenty to twenty-four inches. This is the growth obtained on the bottom lands of this State.

Of course, broom corn is not a crop for universal cultivation. The demands of the market are not such as to justify this, even if all lands were suitable for it. To the extent that the market will justify, it is a profitable crop, and should receive more attention than has as yet been given to it in Missouri. The soil that it requires is one that will produce a rapid and thrifty growth. Such soil exists along almost all the rivers in the State, as well as in the southwestern counties, where is found what is there denominated "mulatto soil." The land that produces a rapid and tall growth of Indian corn will be found appropriate for the cultivation of broom corn.

METHOD OF CULTIVATION.

A thorough preparation of the ground is necessary in the cultivation of broom corn, as the first stage of its growth is very slow and the stalks extremely tender. The ground requires deep, even plowing, and cross plowing will not be in vain; or plowing in the fall and again in the spring. Then thoroughly harrow and roll. The ground thus prepared, begin the planting as early in the spring as the season will permit, taking care always that the soil is not cold nor wet, or the seed will rot in the ground, and thus necessitate a second planting. The ordinary wheat drill will plant the seed, if all but the two outside flukes are taken off, thus leaving a distance of three feet between the rows. Then follow the wheat track, and, as the outside fluke is eighteen inches from the wheel, the planting will be uniform and the rows straight. The seed must be thoroughly cleaned, and attention given to the valves of the drill, as choking will occasionally occur. The ordinary cornplanter, with the attachment for planting broom corn, will also do; and with either machine one man and a team can plant from twelve to fifteen acres per day. The amount of seed required for each acre will be about four quarts.

The most efficient and profitable mode of cultivation is with the sulky cultivator, with which one man and a team will attend to from forty to fifty acres. The first plowing should be done as soon as the corn is up about three inches above the ground. Set the shovels to plow from it. The revolving shield is the best to protect the tender stalks. It should be set as close as possible without plowing out the corn; this leaves the corn on a very narrow breadth of ground, which will not admit of the growth of rank weeds, and such as do grow will be covered up on the second plowing. The second plowing should be when the corn is about knee high, and this time the furrow is thrown toward the row. If proper attention is paid to this work, there is no danger of the crop being taken by the weeds. The field can be cultivated from the start and laid by with the cultivator alone. Even if the stalks are very high at the last plowing, they are not injured by riding over and bending down.

CUTTING AND PREPARING FOR MARKET.

When the crop is sufficiently matured for cutting, it is broken down and tabled—that is, the stalks of two rows are broken and crossed at nearly right angles, thus proving a table upon which the corn is laid when cut. The exact time for cutting is determined by the particular purpose for which the crop is raised. If the farmer raises it mainly for the seed to feed to his stock, then the time for cutting is when the seed is fully ripe; but if the seed is not so much an object, and he desires to get the best market price for the head, then it should be cut as soon as the stock is fully shown and the fiber becomes firm, by which means the rich, ripe green color that the manufacturer likes is secured. As soon as cut the corn should be taken off the table, laid carefully in a wagon, hauled from the field and piled conveniently to the scraper, the seed then scraped off, and the corn put away in good sheds on poles, say in a layer of from three to four inches thick, where it should be left until thoroughly dried. It usually requires from six to ten days to dry properly. When ready for baling, an ordinary hay press will answer for this work. Each bale requires four slats and four wires to secure it sufficiently. Too much care cannot be given to seeding and baling, as proper work in this respects adds to its market value. The crooked corn should be separated from the straight, and baled separately. This assorting should be done while the seed is being scraped off. Many of the details of raising and preparing for market must be learned by experience. The crop can be harvested and even marketed before the fields of Indian corn are ready for the huskers.

YIELD PER ACRE, ETC.

With proper cultivation, and upon proper soil—and no where else can broom corn be raised that will be fit for the manufacturer—the yield will be from four to six hundred weight net per acre; that is, that amount after being stripped of the seed and cured. The average will probably be found to be about one-fourth of a ton. This will sell to the manufacturers at from $100 to $175 per ton, the price depending entirely upon the quality and condition—the first resulting from the choice of soil, the second from the manner of handling. A safe average is about $150 per ton. In estimating the value of a crop, of course there should be included the seed, which is almost equal to oats as a feed for all kinds of stock. Hogs will fatten on it; horses will keep in good heart and condition, and cattle will eat it as freely as they will other grain, with equal results. Some have estimated the seed at seventy-five bushels per acre, but this is a large figure; it would be safe to place it at an average of forty bushels. Take it at this, and the gross receipts for an acre stand, at one-fourth of a ton of the brush at $150 per ton, $37 50; forty bushels of seed at say seventy-five cents per bushel, $30—total for the acre, $67 50; and the labor involved has not exceeded that of raising and marketing an acre of Indian corn.

How far the market for broom corn might be extended, and how much of the inferior growth of other States might be crowded out, is a question for time to determine. The manufacturers in St. Louis would all prefer the Missouri growth, as it makes a more marketable broom. Perhaps upon trial such would be the case with manufacturers elsewhere. One thing is sure—its price, as with everything else, would depend upon the supply and demand; and until the market is affected by an over supply, it would be safe to extend the cultivation. This can be done without involving any extra capital or the accumulation of marketing which must be thrown aside when the crop proves unprofitable. A farmer may raise it this year, and, being disappointed in the results, may omit it next year, as he would any other crop. Under these circumstances, and in view of the fact that it would now pay better to the acre than Indian corn, or wheat, or hay, the cultivation should be extended. F.

AN ADDRESS

Delivered by Prof. Spencer Smith before the Pike County Horticultural Society, at its first Annual Fair, on Thursday, the 24th of October, 1867.

> "A thing of beauty is a joy forever."

No pursuit of human industry more clearly illustrates this beautiful idea of the poet than the avocation of horticulture. It was the occupation of our first parents in the Garden of Eden, and not till sin entered the world was dressing the garden considered a task. And now, as then, tilling the ground may be either a pleasant occupation or an irksome labor. The difference is in the man, not in the occupation. He whose mind has been trained to compare cause and effect—who thinks while he works—is a different being from the mere laborer who sees nothing beyond the accomplishment of his daily task and the gratification of his mere animal wants. Of the intelligent, thinking farmer it may be said, with more truth than of any other man, "he looks from Nature up to Nature's God." With him, too, the view is clear and unobstructed; he is brought in direct contact with the wonders of creation; to him it is eminently given to

> "Hear music in the running brooks,
> See sermons in stones, and good in everything."

For him Nature opens her fairest treasures; all that he sees around him appeals to his love of knowledge, and invites him to come and study. The mountain and the plain, the hill and the valley, the river and the sea, the field and the mine, say "Come, we have treasures in store; they only await your reforming hand." Yet all this beauty, all this loveliness, all this wealth, is lost to him whose mind is as the barren field which has never been cultivated. In vain for him spring robes the earth in richest verdure, and summer's loveliest flowers are passed unheeded by.

The successful horticulturist must be a man of cultivated mind. I do not mean that he must have taken a degree in some college, or even gained honors in the village academy; but he must be a man who thinks, who compares, and makes deductions. All knowledge is not found in schools; neither is the habit of thinking always acquired by reading books. He for whom the charms of knowledge have no attraction, will visit the halls of learning in vain. Professors and teachers may lay before him all the wonderful results of science and art, yet if he does not cherish a love of learning, for its own sake, they will labor in vain. The proper cultivation of the mind must be begun early. The child's efforts must be properly directed; and upon this early direction of the mind will its future course depend.

Though the deeds of heroes and statesmen may attract the pen of the poet and the pencil of the artist, yet I know of no subject for a picture more pleasing to the eye of the man who loves to watch the development of the youthful mind than the group formed by the elder and the younger Stephenson, father and son, as they sat by the evening fireside, mutually aiding each other in solving the problems of science.

George Stephenson was a man who worked his way up from a poor boy, glad to earn sixpence a day at pulling turnips, to be the first engineer in the world, and the companion of kings and princes; yet, though the habit of thinking had overcome many difficulties, and placed him among the greatest men of his time, he always felt the want of an education in the learning of the schools, and when his only son was growing up he determined that he should have their advantages. The father therefore gave him all the facilities that he could afford, and even devoted his leisure time to making and mending shoes in order to obtain the money to pay for his tuition; but the real education of the boy was at home. The father encouraged him to procure books from the village library, and together they read and discussed them. There, in that rude cottage, by the light of the burning turf, were originated those ideas which, in their development and practical application, were soon to change all the commercial relations of the world. There, in that humble dwelling, were questions discussed and problems solved, which were to find their fruition in railroads, locomotives, and stupenduous feats of engineering, in comparison with which the Egyptian pyramids are only as molehills.

This is but a single illustration of what may be accomplished by the habit of thinking. I might go on and parade before you illustrious examples drawn from the histories of both ancient and modern times—yes, examples in your own State and neighborhood, even, where the mind, by dint of application, has raised its possessor to the highest ranks of honor and wealth; but I know that your own recollections will suggest them without my aid. It does not follow that because a man reads a great deal he learns in proportion. He may devour all the literature of the day, but if he does not derive therefrom materials for new ideas—if no thought is inspired—his time is wasted to little profit.

The ancient philosophers had few or no books, but the profound thoughts which have come down to us to show that their minds were ever active in studying the great Book of Nature, whose pages are always replete with subjects for deepest meditation. Many of their maxims of agriculture, after the lapse of two thousand years, with all the light which science and experience have thrown upon them, are found to embody correct principles, and will stand as guides to all future generations,

I have thus dwelt at some length upon the necessity of early training the mind to habits of observation and thought, because I believe that no occupation ot man requires, nay, demands, so much and such careful thought as the cultivation of the earth. The mechanic may learn the routine of his trade, and, by constant practice, be able to follow it almost instinctively. The merchant's thoughts must all run in the direction of how to buy cheap and sell dear; and this is true of almost all occupations. They have particular channels in which they flow, with few obstructions to disturb the uniformity of their currents, but the intelligent and successful agriculturist must be pre-eminently a man of thought. If he has not received the blessings of education, there is only the greater necessity for making up the deficiency by the application of his powers of observation and reason. On the contrary, if intellect has been cultivated in school and college, and he brings to his occupation a mind stored with learning and trained in the mysteries of science, he is only placed on a higher eminence, where his view may be broader, the landscape of learning appear in a brighter light, and his intellectual horizon more extended; yet if thought and study do not sustain him, he is only standing on a dizzy hight, a thing of pity for a gaping world.

It is often said that a farmer needs no education; that practice alone can make a farmer. So far as the animal is concerned, the mere bone and muscle, I assent to the proposition; but, because a man tills the ground and makes it bring forth fruit and flowers, he is to be a mere animated machine, I deny. In no profession (unless it be that of medicine), are constant observation, quick perception, a cultivated eye and ready resource more important than in agriculture. The success of its practice depends mainly upon an ability to adapt any system of farming to surrounding circumstances, and to decide quickly and readily to what cultivation the land is adapted.

In thus dwelling so strongly upon the necessity for bringing the mind to bear upon the labor of tilling the ground, I repeat and reiterate that I am laying the foundation of all true progress in agriculture. The labor of the farm and garden must henceforth be enlightened labor. The introduction of machinery into the economy of the farm enables us to do without many of the human machines which were formerly indispensable. Ribs of steel and hands of iron now take the place of bone and muscle; and intellect supplies the place of physical strength. I have refrained from urging upon you the study of books, for the mere consultation of the writings of others is the easiest part of real study. Those who are in such close communion with nature as the farmer and horticulturist are in a position where they can go to the original source of all knowledge. No other profession opens so fair a field for investigating and searching into the realms of nature. No other profession offers such rich prizes for scientific experiment and skillful practice. But, strange as it may appear, the farmer and gardener are too often the last to appreciate the advantages of their position. They follow the plow and gather their crops while nature blooms and ripens around them, all unconscious of the mighty laboratory in which they work.

The love of horticulture has been a source of the highest enjoyment to some of the most eminent men of all lands and all ages. The academus, or public garden of Athens, was the resort of her philosophers and poets; and the fact that Socrates and Plato taught among those groves shows that these great men were not indifferent to the charms of nature. In our own country, Washington, Jefferson, and Hamilton have made the names of Mt. Vernon, Monticello and La Grange immortal, as the spots where—throwing off the cares of state—they beguiled the hours among the peaceful pursuits of horticulture.

But an art so beautiful certainly does not need the sanction of great names; there is something in our hearts which ever responds to the sight of beautiful trees and flowers.

The celebrated Wirt, while pleading the cause of Blennerhassett, thus describes that unfortunate man's home: "Possessing himself of a beautiful island in the Ohio, he rears upon it a palace and decorates it with every romantic embellishment of fancy. A shrubbery that Shenstone might have envied blooms around him. Music that might have charmed Calypso and her nymphs is his. An extensive library spreads its treasures before him. A philosophical apparatus offers to him all the secrets and mysteries of nature. Peace, tranquillity, and innocence shed their mingled delights around him."

We have energy of character and determined spirits, qualities necessary to found empires, and we have become a great and mighty people. We rejoice in our strength, and are fond of comparing our youthful vigor with the declining age of older nations. But in the lustiness of our manhood let us not forget those softer amenities and those arts of refinement which are necessary to embellish and adorn a nation.

Such societies and exhibitions as these of yours are the proper means for producing such refinement. That man must be stolid indeed who can look around on this beautiful display of the products of the garden, the vineyard, and the orchard, and not feel inspired with feelings of love and gratitude to the Great Giver of all good, who has willed that through the primitive employment of horticulture "the desert shall rejoice and the wilderness shall blossom as the rose."

Horticulture increases the beauty and comfort of our homes, and tends to foster and cherish the domestic virtues. On this ground it is of great importance in the social system; for much of the love of country is inseparably connected with the love of home. Apart, then, from the uses of horticulture, which are evident to all, such as the raising of fruits and vegetables, it has a moral use which cannot be overrated. Its influence upon the young must necessarily be beneficial. The pleasures of the garden are pure and simple; they produce a love of what is beautiful in nature, and thus tend to elevate the mind. Addison says, "I look upon the pleasure we take in a garden as one of the most innocent delights of human life. A garden was the habitation of our first parents before the fall; it is naturally apt to fill the mind with calmness and tranquillity, and to lay all its turbulent passions at rest; it gives a great insight into the contrivances and wisdom of Providence, and suggests innumerable subjects for speculation."

Again, horticulture, in its most extensive sense, includes not only the raising of vegetables, fruits, and flowers, but also the beautiful department of landscape gardening; and it may be said with truth that horticulture is at the same time the earliest indication of civilization, and the result of its highest development. Like all the arts which serve to civilize and refine mankind, it is the offspring of association. The savage sees no beauty in the blooming prairie; the solitary ranchero is never touched by the sublimity of the scenery amid which his flocks and herds increase and multiply. And it is to be feared that the semi-solitary life which many of our farmers lead on their isolated plantations does not tend to increase their love for the social virtues and enjoyments which go so far toward rendering a community prosperous and happy.

Societies, meetings, social gatherings, intercommunion of thought, serve to stir up and create a desire for better things. Indifference is the besetting sin of the solitary farmer; he is often "monarch of all he surveys," and, not coming in contact with others as despotic as himself, he becomes accustomed to what he sees around him, and indifferent to the rest of the world. If it is ever hinted to him that he is behind the age, and the march of improvement is leaving him "out in the cold," he takes to himself the comfortable consolation that he has grown up to the present day, and his children can do the same in their time. He does not stop to consider that his sons would be more intelligent, better farmers; that his daughters would be handsomer, more attractive, and make better wives, if they could grow up amid the surroundings of a home where energy and taste directed the labor. Such, it will be found, are among the first and most powerful effects of societies and exhibitions like yours. They induce a love of home, and a desire to make that home beautiful. Downing says that "the mere sentiment of home, with its thousand associations, has, like a strong anchor, saved many a man from shipwreck in the storms of life." How much the moral influence of home may be increased by making that home all that it should be, and how much an attachment is strengthened by every external sign of beauty, needs no demonstration here. All to which the heart can attach itself in youth, and the memory linger fondly over in riper years, contributes largely to our stock of happiness, and to the elevation of the moral character.

For this reason the family home should be raised till it shall symbolize the best characters and pursuits—the dearest affections and enjoyments of social life. But the settlers of the forest and prairie may, with some reason, say "this is all very well for older countries, where the facilities for building, material, and workmen are abundant; but for us, who are obliged to combine all the trades in ourselves, with hardly more than an ax and saw for tools, what is the use of talking to us, in our log cabins, of taste and rural architecture? What time have we to spend on the flowers and fruits of the garden?" Some of this is true; but do not some men build handsomer cabins than others? Is it always the richest man that has the best house? Can you not think of one of your neighbors who, without spending more money than others, has contrived to render his home more tasteful, more tidy? Has he not made the surroundings neater—given them a more comfortable appearance than the rest of you have done? Is it not a pleasure to visit that man, and enjoy the hospitality of his home? Even if the floor is made of puncheons, they are well hewn and smooth, the joints are close and even, the logs are fairly trimmed, and the crevices well "chinked and daubed." Everything is in order; the door swings clear, the latch catches well, and the "string," a good substantinl one, "always hangs out." Nor is this air of thrift and prosperity confined to the dwelling. The outhouses, barns, and stables are neatly (not expensively) built; the yards are kept in order; the fences are in good repair; nothing is left for to-morrow, or for some one else to do.

Such men are an acquisition to a neighborhood; they stir up others to emulation, awaken energy, and create a desire for better things. Let a man once make up his mind that he will have his home neat and tidy, and it is done. It only requires resolution; this taken, and hindrances disappear like the "visions of night." The magic of will overcomes all difficulties. It is to your associations that we must mainly look for bringing about a state of local and national prosperity.

By meeting together you exchange views, make known the discoveries which you have made, and encourage each other in overcoming the troubles and perplexities of life. Let, then, every member give his hearty support to your association; let no petty strife nor party discord mar the harmony of your meetings; no coldness or want of interest sow the seeds of decay and dissolution.

And, above all, do not neglect one great element of success—the co-operation of your wives and daughters. The female mind naturally tends to the study of the graceful and the beautiful. Let, then, the presence of woman lend a charm to your meetings. Let her exhibit flowers of her own raising, the fruits of the trees which she has planted, and of the garden which her own hands have tended. Once engage their co-operation, and your society is a success.

In the cultivation of flowers, woman finds congenial employment; and while it is given to her taste to lay out and direct the management of the flower-garden, men, be not chary of your helping hand. Too often we of the stronger sex ignore the existence of the garden, and leave to women the ruder labors which the more hardened muscle can so much easier perform. Do not treat the flowers, those silent teachers of tender thoughts and gentle emotions, with contempt. Do not inquire how they are to be cooked, or how much per ton they will bring in the market.

Give way to the charming influence which beautiful flowers always throw around a farmer's home. Join in the delightful labor. It elevates the mind to something above mere sensual existence. The little time spent in aiding the work of the garden will never be felt in the cornfield or the wheat harvest. Even counting by dollars and cents it will be found that a well-tended garden is the most profitable part of the farm.

Mingle, then, the ruder occupation of the field with the pleasant sensations of the garden. Foster with assiduous care the feelings of tranquillity and innocence which the pursuits of horticulture awaken, and soon your fertile farms and beautiful homes will attest the thrift and happiness of a cultivated and enlightened people.

THE PEACH ORCHARDS OF WESTERN MICHIGAN.

BY W. C. FLAGG.

BENTON HARBOR, MICH., *August* 27, 1867.

The rain ceasing a little before noon, the committee started out under the guidance of President Samuel Jackson, Dr. R. Winans, and others, being a reception committee on the part of the Horticultural Association of Western Michigan. We started along the northern lake shore, stopping first at the residence of Dr. R. Winans, about three miles northwest of the larger town of St. Joseph, and thirty feet above the level of the lake. There are fifty-four acres of land, sixteen of which are in fruit. The planter of the vineyard and orchards was Dr. Collins, the present proprietor having been hardly upon the place two years.

Apples are planted among the peach trees. We find the Baldwin bearing well; the Fameuse, also, but scabby. The fruit is badly infested here, as well as in Illinois, with the codling moth and the bark louse, injuring some of the trees. President Jackson says that cutting back in spring and manuring highly is the best remedy. A vigorous growth is thereby stimulated, and the minute monster is overcome.

Of pears, we find sixty trees of Bartletts, of good size and healthy foliage, but with some blight among them.

Of peaches, we find a good sized orchard and many standard varieties. A small orchard, mostly of Hale's early, set in 1863, is composed of peaches exclusively, and having good cultivation and top-dressing of muck from the adjacent marsh, looks very thrifty and fine. Forty-eight trees of this variety yield this year three hundred and thirty-seven baskets that netted $375—a very fair return for a little less than a third of an acre of sandy soil. In the older orchard we find the trees planted with apple trees at a rod apart, which seems too close even on the sandy soil. Of varieties we find Wheeler's early, a peach succeeding the Hale's early, a red peach with red flesh throughout, and a stone nearly as smooth as a hard-shelled almond—glands globose; Troth's early (not so much planted here as in Southern Illinois), Coolidge's favorite, grosse mignonne, Crawford's early, rotting a little; Bergen's yellow, not succeeding; oldmixen free, bearing well; Crawford's late and lemoncling; a peach called yellow rare ripe, supposed by some to be honest John (yellow), and ripening before the early Crawford, is also somewhat planted. The Hale's early have just been marketed, and Wheeler's early commenced upon at this date.

Grapes are cultivated extensively near the house on the higher land. Some Delaware vines in their third year were bearing a little fruit that was just beginning to color. The vines are planted six by six feet, and trained with two arms to a low trellis only three feet high. It is thought the fruit fills better nearer the ground. The older vineyard planted on a low sheltered slope in 1860 with the Catawba and Isabella varieties, has a good deal of fruit. The bunches are rather loose, but the berries are abundant and large. The vines are trained, rather informally, on a trellis with three wires. I have omitted the number of vines in my notes, but I find the vineyard produced seven and three-fourths tons of grapes in 1865. Last year it did not bear, owing to a frost. This year it is thought the product will be ten tons.

Small fruits are considerably planted. A reclaimed swamp is set with blackberries, ten by two, with two rows of strawberries in the wide space. There are three acres of strawberries, consisting of Wilson, triomphe de grand, Russell, and agriculturist. The triomphe de grand is preferred, though Dr. Winans admits there "may be the most money in" Wilson's Albany. Mr. Jackson says that with extra cultivation the triomphe de grand is the best, as it brings nearly a double price and produces more than half as much.

Leaving Dr. Winans, after a sumptuous dinner, we went northward again, through some newly cleared and wild land, valued at $300 an acre (such is the rage for fruit growing), stopping to take a view of Lake Michigan from one of the highest points in the neighborhood. A bluff of sand and clay, 200 feet high and almost perpendicular, rises from the edge of the lake and commands a wide prospect of this noble sheet of water. Shades of blue, green, and purple dappled its surface in the light and shade, and the white sails of vessels broke its primeval solitude. We left, reluctantly, this romantic spot to perform our more prosaic duties of examining fruit farms. Samuel Jackson, president of the Horticultural Society, and one of the most prominent fruit growers of this region, owns a farm of fifty acres two and one-fourth miles from Benton Harbor, and 150 feet above the lake, from the winds of which it is sheltered by a high ridge. Thirty acres are in fruit trees, mostly peach, comprising Hale's early, Wheeler's early, Coolidge's favorite, grosse mignonne (600 trees), Crawford's early (600 trees), oldmixen free, sugar or Stanley (a local variety), Crawford's late (400 trees), and Morris white. The peach orchard is full of fruit. It has been plowed twice this year, and the imperfect fruit thinned out. It is still too full of fruit, and propped with numerous poles to save the bending branches.

An interesting feature of this orchard is the extraordinary size and age of a part of the trees. Although set twenty years ago, about nine-tenths are still living and bearing well. A tree of the grosse mignonne variety measured forty-eight inches in circumference one foot above the ground, and the boughs extended over a circle thirty-four feet in diameter. Forty-one Crawford's early trees of the same age yielded, two years ago, 1,000 baskets of peaches, or nearly twenty-five baskets to the tree.

The heath cling, Mr. Jackson informs us, ripens very late, and can hardly mature some seasons.

Of apples, we note Tompkins county king, very large; Swaar, defective; Rhode Island greening, full and fine; rambo, overbears—fine fruit; northern spy, bearing fair crops at the age of ten or eleven years.

Pears are blighting, but the Seckel shows some good fruit.

The proprietor of this fine place was making preparations commensurate with the promise of the crop; 5,000 baskets, and the material for a larger number of boxes, were stored away in the barn ready for use. Fruit ladders in the shape of light step ladders, of from six to fourteen feet in hight, similar in shape to those used in our houses, but with broader bases to stand more firmly, were making for the coming harvest.

The remainder of the afternoon was spent in making a circuit inland and passing in rapid review a great number of farms, generally small ones, and planted largely with the small fruits. Raspberries and blackberries are grown a good deal in rows between the peach trees, to economize land, which becomes an object when the market price of unimproved fruit farms is $500 per acre.

Peaches begin to ripen here generally from the fifth to fifteenth of August, or about a month later than at South Pass. The curl leaf was worse than common this year—poorer than it has been for four years.

During the intervening period the trees have been comparatively exempt.

In the evening the Horticultural Association of Western Michigan held a special meeting in the hall of the American House. A large attendance of ladies and gentlemen was evidence of a great local interest in the subject of fruit growing. Some beautiful vases of flowers, crabs very highly colored in this northern climate, late strawberries, Delaware grapes, beginning to color, fine blackberries, and some very large specimens of Hale's early, adorned the tables.

The members of the committee were elected honorary members of the society, and called on for speeches, which, it is to be hoped, were interesting. In turn, information was asked for as to the causes of the peach rot.

Dr. Winans, being called up, said he was not prepared to give an opinion. He had noticed where trees had been manured that the fruit grew larger and rotted more.

President Jackson attributed the rot to warm wet weather. In 1863 there was a large crop and no rot. The weather was dry and cool. In 1865 the weather was warm, wet, and showery in August and September. On lower grounds, where trees were thriftiest, the rot was worse. Hale's early lost half its crop in some cases. Trees of a drooping habit were more subject to rot in the fruit. In 1866, the weather being cool and wet, the rot prevailed among old trees of yellow rareripe (a local name). The ground under these trees was not dry during the whole period of gathering. He would recommend higher pruning and thinning out of branches.

Mr. Chapman said he had no trouble with any variety except Hale's early. In 1865 rot came with sultry weather and disappeared after a rain and clearing up. There was a similar experience this year. He attributed rot to a stagnant condition of atmosphere. Thought open heads might be good. Had discarded Serrate varieties.

George Parmele, who has had twenty years' experience here (having planted the oldest orchard of Mr. Jackson), had noticed that the rot was mainly confined to early peaches, without much regard to varieties. It occurs when the mercury is low in the barometer, and when growth is most rapid, and at the time of ripening. Rust in wheat, the dry, black rot in the tomato, and the potato rot, all seem to occur under similar conditions.

ST. JOSEPH, MICHIGAN, *August* 28, 1867.

There was quite a rain last night, and the weather is cool and clear this morning. The sandy soil is hardly affected, so far as good roads are concerned. We stopped first this morning at W. D. Sherwood's, to look at the notable plantation of blackberries, consisting of one hundred and thirty square rods, two years planted, eight by four feet apart.

The soil is a clay loam. It was manured the fall after setting with sawdust and ox manure. The main stalks are cut back in June, and the laterals pinched at the foot in length and not permitted to grow larger. In the spring the laterals are again examined, and those cut off that are considered too long. From these one hundred and thirty rods, one hundred bushels have been shipped this year, and there is still promise of a good deal of fruit. It is the finest blackberry patch yet seen by the committee.

From an acre of Doolittle's black cap (1250 plants), set a year ago, thirty bushels have been shipped this year.

J. E. Stevens has a farm of one hundred and thirty acres, thirty-five of which are in fruit. The apple trees upon this place, consisting of Roxbury russetts, Rhode Island greenings, Baldwins, etc., were among the finest seen at this point, being very vigorous and symmetrical. The 2000 Isabella and Catawba grape vines, trained on a wire trellis, were hardly as good, but the general aspect showed thorough culture. This and another farm near by are the property of a man of business, whose various and numerous occupations as steamboat owner, merchant, lumber dealer, etc., at several points, must leave but little time to the oversight of his horticultural grounds. Yet this place, we are informed, is paying its way.

Sherwood & Potter have forty acres, twenty of which are in fruit, consisting mainly of three acres of grapes of the Isabella and Catawba varieties, planted in terraces and now bearing their first crop, and of a peach orchard, in which the trees are planted too near together being only one rod apart The varieties are Hale's early (100); large early York (200); Crawford's early (400); Crawford's late (400), and more or less of honest John (yellow); honest Abe and Douglass' favorite (local names).

Hatch & Durrie have forty acres, twenty in orchard, mostly peaches. The varieties are Royal Kensington (this may be honest John); Hale's early; Wheeler's early (large early York is preferred—is said to be in succession to Hale's early—this is not the case in Illinois); George IV; Crawford's early; oldmixen free; Crawford's late; Morris' white, and Keyport white, much esteemed as a late peach. The trees are planted a rod apart and are evidently too much crowded, although the lack of circulation is not probably so fatal to the fruit as it would be in the warmer south.

We passed in rapid review a long line of small and tidy fruit farms of ten, fifteen, and occasionally twenty and thirty acres. Among these we noticed the nursery and fruit farm of S. T. Heath. Mr. Heath is putting up a canning establishment, and expects to put up ten thousand cans this season. Unless his peaches net seventy-five cents per basket, he will prefer to can them. Tin cans holding three pounds are used; four ounces of sugar are allowed to the can. The tops are soldered on—not sealed with wax.

We now passed the fine residences of John T. Edwards, Captain

Rounds, and Captain Naper, and other maritime (or rather lacustrine) men, who have fallen before the epidemic, and also planted peach orchards. By noon we were crossed to the south of the St. Joseph river, and stopped to dine with John Whittelsey, Esq., whose vineyard, under the management of Thomas Archer, exhibited the finest show of grapes seen in this region, and enough to convince any one that grape culture can be made successful on Lake Michigan as well as Lake Erie. Mr. Whittelsey has 11½ acres of ground, seven of which are in fruit. He has 2000 grape vines, six years planted, of Catawba, Isabella, Delaware, Concord, Hartford prolific, Creveling, Iona, and Isabella varieties. These have been planted six years, and are as yet free from rot or mildew. They are planted on a steep bluff along the St. Joseph river—winding in and out with the sinuosities of the shore—so as to lie south, southwest, and southeast. The soil is rather sandy.

The vines are planted eight feet apart, on terraces faced with blue-grass sod. Posts are put in eight feet apart, and four rails are nailed on at the hight of one, two, three, and four feet. On this trellis the vines are trained on Fuller's system, in the main, though a little fruit is grown on spurs. Arms four feet long are trained along the lower rail, and from these spurs are grown to the top of the trellis. The finest fruit is on the upper and more sandy terraces. The poorest and smallest quantity on the lower and clayey terraces; the vines, however, are younger on the latter. The terraces, winding in and out along the tortuous declivity of the hill, are an adornment to the landscape, as well as possessed of more material charms, and set off finely Mr. Whittlesey's otherwise handsome grounds.

A Delaware graft of two years of age, on the Isabella, with one hundred and twenty-five to one hundred and fifty clusters of well shouldered fruit, added another argument in favor of grafting that variety. The grafting was done in the fall, beneath the surface.

The Rebecca we found here bearing some fine bunches of fruit, such as we have not seen in the lower latitudes.

Passing out northward, our party stopped next at E. W. Collins', who has ten acres of ground, four of which are in Isabella and Catawba grapes, the Isabella planted ten by ten, and the Catawba ten by five. Found some brown rot here, and the crop not looking so well as at Mr. Whittlesey's.

Dr. Chapman has twenty-five acres, on which are twelve hundred pear trees, mostly Louise Bonne and Duchesse, planted ten by ten. One thousand peach trees and three acres of grapes. Vicar of Winkfield and Winter Nellis have blighted as dwarfs. The vines are Isabella, Catawba, and Delaware, the latter not thriving so well as last year.

Passing Mr. Archer's, he showed us a small vineyard, two years old from the propagating bed next June, that he expects to fruit next year. The growth was strong enough.

Two acres of bearing quince trees were pointed out at another place, and said to be profitable.

Dr. Bigelow, immediately on the lake shore, with only a narrow belt of forest between him and the lake, has seventy-five acres; forty in fruit, comprising three thousand peach, fourteen hundred apple, four hundred and fifty plum, three hundred and fifty cherry, and two hundred and fifty pear trees. We saw here, of plums: purple Gage, very full of fruit; magnum bonum (?), large, ripe, and luscious; yellow Gage, and other unknown sorts. The Doctor is also planting ten acres of Kittatinny.

Still further southward, along the shore, we passed "Whittier's model fruit farm," so extensively advertised in a lottery last year. It looked very weedy, dirty, and unlike the adjoining plantations, or the trim picture given in the advertisements.

Still further along we came upon our old friend, H. A. Truax, on a farm of seven and a half acres, cut out of the brush within the last year, and now planted to pears, peaches, and strawberries. Wilson strawberry, cultivated in hills, was looking finely, as also the numerous flower beds. Peach trees are grown with a leader, Mr. Truax not liking the hollow centers and the breaking down they entail.

Dr. Pettil, still further on, has a fine place of forty acres, opened by Mr. Truax six years ago. He has three thousand peach trees, one hundred apple, five or six acres of dwarf and standard pears, seven acres of Lawton blackberry, three of Doolittle's black cap, one of Philadelphia, five hundred cherry trees, three acres of Concord and Hartford prolific grapes, planted ten by ten, with strawberries between.

D. N. Brown, nearly opposite, and on the outer limit of our observation in this direction, has twenty acres under cultivation, and some fine grape vines five and six years old. Diana has good clusters; Rebecca, no profit; Concord will pay, good clusters; Hartford prolific, planted ten by ten, is bearing well. The view from the observatory of Mr. Brown's house extends far over the lake, southwest, west, and northwest, and out upon the forest inland. We are here upon the borders of the pine and oak woods, where the two intermingle their varied shade, and the contrast is peculiar and attractive.

By this time the second day was well over, and we turned our faces toward St. Joseph again; and, through the kindness of Mr. Stevens, were shipped at 11 P. M., along with sundry baskets of peaches, on board a steamer of the Stevens line, for Chicago. The two days spent at this point were full of interest, and the hospitalities of the fruit growers of St. Joseph were such as will make permanent our pleasant recollections of the eastern shore of Lake Michigan.

FARMERS' SONS.

BY MRS. R. E. SMITH.

Bear with me awhile, my young friends, while I endeavor to let you into a few secrets appertaining to your welfare and the comfort and pleasure of all around you. You doubtless do your duty according to the old song:

> "You plow and you sow,
> You reap and you mow."

You make the fence, you herd the cattle, you shear the sheep; in short, you fulfill all the duties of farmers' sons *out of doors*. Of this I have not the least doubt; but do you ever think that you are intellectual beings, as well as laboring machines? Do you remember that you have hearts and affections, likes and dislikes, attractions and repulsions, and all the powers and faculties of "*man*, the noblest work of God?" If you do, and act upon your knowledge, then you may pass by my humble essay with only a glance. But I am afraid, from what I have noticed, that you forget some of these things, and are altogether unconscious of others.

In these days there are books and libraries within reach of all and any of you. You may improve your minds in the intervals of labor by studying any science or art toward which your taste inclines. In the sciences of botany, mineralogy, geology, meteorology, natural philosophy, and natural history, you have opportunities of gaining accurate knowledge without any trouble or hardship; while many a naturalist has sacrificed home and friends, and all the comforts of civilized life, to secure the like. You may take your stand among the most intellectual and greatest men of this or any other age, by daily observation and record, if attended with the amount of study necessary to comprehend the technical terms and forms of generalization peculiar to any branch of science.

Hugh Miller, the poor studying stonemason, made himself both name and fame, to say nothing of independence, simply by improving the opportunities afforded by his calling. He had no time for study except that taken from his needful rest, but he mastered the technicalities of geology, and then he went to nature's workshop and not to a "cabinet," to verify his learning, and in so doing made new and astounding discoveries, which his more learned contemporaries had failed to achieve.

Thus much in behalf of books of instruction and the way to use them. Now for histories, and travels, and agricultural and other journals. Do you read any or all of them? Did you ever read any of Virgil's Georgies, and discover how the old Roman cultivated his acres —very much as you do now, except that he saw the poetical side of his occupation, and painted it in verse, which will be read with delight so long as there are men to feel the beauties of nature and the charms of poetry? Did you ever peruse the strange adventures of Marco Polo, of ancient, or of Atkinson, and Taylor, and Livingstone, of modern times, and compare the methods of cultivation and the products raised in far-off countries with those of your own State? Do you seek information as to new methods of farming and labor-saving machines, and endeavor also to furnish your own quota for your local paper, thus improving your own minds, and contributing to the welfare of your neighbors and friends?

I fear that you think all this mere "book learning"—a something entirely out of your sphere. But why should you not possess book learning? Is there anything incongruous in your so doing? May you not be nature's noblemen, not only the bone and sinew of the country, but its mind and heart as well? Indeed you may, and from your calm and serene stand-point look down upon the dwellers in towns and cities with pity for their pigmy forms, their wasted health, and puny limbs.

This for your minds, while your occupation will take care of your bodies.

Now, I would speak to you of your hearts, with all their wealth of affection and desire. Do you lighten the labors of your mothers and sisters as much as in you lies? Do you remember, that though they do not toil in the field, they do so over the cooking-stove, the wash-tub, and the churn? You like fresh linen, sweet rooms, white table-cloths, well-cooked food, a well-made bed in which to rest your tired limbs? Well, it takes work, and hard work, too, to have all these things ready for you.

Do you always see that the wood is dry, finely split, and of a proper length for the stove, the bucket full of water, the cooking knives sharp, or do you leave all these duties to chance—sometimes done, but more frequently neglected.

If, in addition to all that she must do in the course of the day, your sister or your mother must lift all that her strength will allow of in carrying wood and water in and out of the house, is it any wonder that she is not very good natured when evening comes and she has not only to put your toothsome supper before you, but often to work on far into the night, in order to clean up and make ready for the early breakfast?

Do you ever go into the house and march across her spotless floors in boots reeking with the manure of the barnyard or the muck of the field? Do you seat yourself at her well-ordered table, offensive with sweat and the odor of the stable, and address her in the same tone as you would your dog, if everything placed before you is not exactly to your liking? Do you grumble if any of the "*women*" want a horse harnessed, or ask you to drive them to a neighbor's, the church, or the nearest town?

They are much indoors, and their occupations extremely monotonous. They do not have the fresh air, the varied sights and sounds of the country, so exhilarating and refreshing to both mind and body, as you have, and need to vary the scene a little once in a while.

How often would I have lingered out of doors on a spring morning, enchanted by all the beautiful, and hopeful, and healthful surroundings of such a season! but the breakfast dishes must be washed, the dinner-pot must be put on, the butter must be churned, the cheese must be set, the washing, the ironing, the sweeping, the bed-making, the mending, the poultry-feeding, the calves' milk, the chickens' dough, the culling of vegetables, the picking of berries, the preparing of them for the table, the can, or the market—all these things, and many more, called me away, and with no "small voice."

I went into the house and exchanged all the charms of May for the steam of frying fat, the heat of a cooking-stove, the greasy dishwater, and the sooty pots and pans. And I did it willingly, for I loved to set a good meal before my husband and his sturdy helpers. I took pleasure in providing everything in the neatest and most inviting manner, that he might feel that I appreciated his labors and was glad to do my share.

In return, I naturally looked for some deference to my wishes, and consideration for my wants, even if I did not proclaim them from the housetop and insist upon having all that was my due with fretful pertinacity—which, I am sorry to say, is sometimes the only way in which a woman makes known her desires, and also the sole method at all effectual with her masculine friends.

This ought not so to be. Cultivation, refinement, true politeness, which spring alone from the heart, will render your homes in truth the "dearest spots on earth," and when you go forth among men to win your way and carve out your own fortunes, be sure that they will then, too, be among the most effectual means of advancing you to high and desirable places in society, which so many of you covet. But love, and confidence, and mutual support, and home affections are worth all these.

If adversity befalls you, they will still remain, the fruit of your advancing years, whose seed was sown while you were yet *farmers' sons* in the old homestead.

FARMERS' WIVES AND DAUGHTERS.

BY MRS. R. E. SMITH.

Do you know that you are a power in the land? Let your husbands, sons, and fathers vote as they will, so long as you reside at home, and wield that influence which is, always was, and always will be yours without question—the influence of the "still small voice," and which, even in the ways of the Almighty, was once shown to be the divinest of influences, so long will your power be almost unlimited. Have you not the earliest training of that class which must needs be the basis of any nation's prosperity? Can you not instill the love of nature in all her beautiful forms into the plastic minds of your sons and daughters, that the former shall grow up to be the intelligent, healthful, and appreciative cultivators of the soil, and the latter their worthy helpmeets in all the lighter—yet not less necessary—labors appertaining to the house, the garden, the dairy, or the poultry-yard? But to do this you must educate yourselves for the purpose. You must weigh well what you desire to be. Would you be mere drudges, unthinking, unreasoning, mechanical hands—laborers, dragging through the weary day, to look back but upon the "three meals," the well-scrubbed floors and spotless paint when you retire at night, with a sigh that the morrow will bring no change? No wonder, then, that so many of your daughters think the city an Eden and the boarding school a Paradise; no wonder that anything is preferable in their eyes to such a life. On the other hand, beware that you do not forget that your lot is cast on a farm, and so cultivate your minds that you will not be fit for that lot. There is a kind of training (or rather the want of it), a kind of helter-skelter, chance system of so-called education, which unfits girls for every and any rational pursuit in life, and which is too often met with at the present day. It consists in a smattering of every thing—science, art, ancient and modern languages, accomplishments, etc., without end and number, while mental discipline, moral training, and sound principles of action are entirely ignored. Do not allow yourselves to be drawn into any such system. Consider that if you would rear men, you must possess that kind of knowledge and that power of self-control which will command their respect, not only while they, as infants, believe in and respect their mother solely as their mother, but when they become of an age to look up to you as possessed of the wisdom of a self-contained purity of heart which shrinks from a breath of impurity as the mimosa from the sirocco. You must be large-minded, cool, firm, and capable of seeing the end from the beginning. You must prove to your sons that though you cannot calculate an eclipse, you can foresee the consequences of a given course of conduct; though you cannot break a colt, you can rule your own spirit. You must prove to your daughters that though you cannot speak French, you can make use of "words fitly spoken, like apples of gold in pictures of silver." You must by your daily walk and conversation command respect and love. This is no light task, the result of no superficial and boarding-school training. Choose what means you will (and they are, happily, at hand on every side), but remember what you would be, and have this definite end in sight from the beginning. And when this school training is ended, remember that real life is yet all before you, and to a great degree you may make it what you will. You may so adapt means to ends; you may so influence purposes and sway minds as to make yourselves honored and happy or neglected and miserable. You may consider labor a blessing—your position on a farm one opening to you sources of the purest and most heathful pleasure, or you may look upon labor as a disgrace, and pine for the false excitement of fashion and show. But one thing let me assure you of: you cannot by changing place or occupation escape the ills of life. They will find you by the marble hearthstone as by the ingle-side, and it is only the calm, well-poised and christian mind that can meet them in either place with serenity and faith.

This is the sober side of the picture. Now let us turn the leaf, and enumerate a few of the pleasures and amenities of the farmer's life, and in the reflected light of the happy home you have made for him, behold the fair matronly faces, the rosy, girlish cheeks and sparkling eyes which exercise in the open air and the silent influences of mother nature have produced. There is no elixir like the summer breeze; no painter like the winter's breath; there is no music like the thunderer's roar; no spectacle so beautiful and yet so grand as the forked lightnings impress on the murky cloud. And when with friends and neighbors you gather round the spacious hearth, your themes of converse may be of all that God has made, and with which you live in daily, hourly contact. Farmers' daughters, cultivate your gardens, beautify the environs of your homes with rare plants and curious shrubs; bud your roses, slip your geraniums, raise seedlings, and pry into nature's secrets until you have no time for pining after the prevailing mode. Farmers' wives, encourage all these simple, natural and beautiful tastes, and do not ask "What is the use?" But let me beseech of you, on the other hand, not to make mere flowers, or leather leaves, or worsted dogs and cats, which one might most devoutly worship without a breach of the second commandment, or, in short, misspend your time in any such nondescript adornings. I once read an essay in an agricultural report in which a lady enumerated not less than twenty different kinds of this truly "fancy work," and endeavored to convince her readers that home would of necessity be beautiful if crammed with such articles. Sometime afterward, I became acquainted with the authoress, and was not a whit astonished to find her children ragged and dirty; while her table was never set regularly except for *company*—all her own family eating what they could, where they could, and as they could. Her house rivaled Barnum's Museum in its cabinets of dusty paper, baskets, nut-shell baskets, alum baskets, perforated card baskets, holding bushels of so-called apples, pears, grapes, lemons, etc., etc., *ad infinitum*, concocted of wax and gamboge, and Prussian blue, and vermillion and Vandyke brown—but my pen fails me to describe the rest. And what shall I say of the pyramids of shells, the wreaths of seeds, the fishes created out of darning-needles and cotton flannel, the water-color daubs, the oil blotches, setting forth more than the seven primary colors, and yet representing nothing" in the heaven above, or in the earth beneath, or in the water under the earth," the silk, the cotton, the crewel embroidery, the chaos come again, which reigned in those-dust lined, thickly stuffed and suffocating rooms? The catacombs of Egypt were not a circumstance to them. A window full of rare and beautiful plants would not have cost one tenth part of the time and labor, and would have been a source of the purest intellectual joy, and refining and ennobling thoughts. There is no beauty without neatness and order; and these the lowliest home may have. There is no comfort without regularity and system, and a want of these will render a palace the home of discontent. If you can have but a calico dress, it may be neatly made, washed, ironed, and worn with a grace which an untidy silk would fail to possess. If you wish for jewelry, there is the scarlet geranium, the pure white rose, the fragrant mignonette or deep green myrtle to weave among the glossy braids of your well-kept hair. If you have no carpets, the floor may be guiltless of a stain; and if no china, the table may still be arranged in order, and care may have preserved the plain delf free from chips and scars, and cracks, and made the steel forks shine. In a thousand and one ways may your handiwork be seen, beautifying whatever it touches. Be sure that all these things have a powerful influence on those who surround you. You will find the most stolid and unappreciative gradually softening in tone and manner, becoming more observing and more helpful. The clodhopper, who has never known but to follow the plow, will, before long, hesitate to soil your snow-white floor; he will comb his hitherto unkempt locks and polish his sunburnt face with liberal applications of soap and water until it shines again, before he seats himself opposite you, with your neat garb and smiling countenance. With a determination to elevate first yourself, then all around you, you will assuredly succeed, and many "sons and daughters shall rise up and call you blessed."

SHEEP HUSBANDRY IN MISSOURI.

BY SAM. P. BOARDMAN, LINCOLN, ILLINOIS.

It needs in this day no formal array of facts to show wherein sheep husbandry is not only profitable in Missouri, but also more profitable than in those eastern States which are more largely engaged in the business. I will glance at but a few of them: First, the greater cheapness of Missouri lands; second, their—in general—greater fertility; third, the less amount of labor necessary to produce an equal amount of winter feed; fourth, the greater mildness of the climate, rendering less winter feed necessary; and last. the great amount of summer "range" lying open to the free use of the Missouri wool grower for pasture. In those eastern States most largely and most generally engaged in wool growing, as New York, Ohio, and Michigan, flockmasters are compelled to keep their flocks within their own domains almost wholly. In large sections of the east in which wool growing is the leading branch of agriculture, farms rate at from forty to one hundred dollars per acre. Within my personal knowledge, even the latter value of land has not driven out of the business old wool growers of forty years' standing; this, too, not because their lands are rough, hilly, grazing lands wholly, but on account of their strong faith in, and love for, the business; and farmers' *faith and love* in their business, as we all know, depends generally on the *profits* of their business. On this point, however, it is safe enough to say that the wool growers of those States to which reference has been made have, taking a term of the past forty years, made at least equal profits with farmers pursuing either other specialties in agriculture, or a mixed husbandry. In estimating the profits of any kind of farming, crops or stock, the only true and safe way in our fickle country is to base the estimate on a term of not *less* than ten years. We are a people of extremes, and very much given to running things into the ground.

Comparing Missouri with adjoining States—in respect to wool growing—we find that she possesses advantages over some of her neighbors separate from other *western* advantages common to them all; over Iowa in climate, and over much of Illinois in "outside range," climate, and plentifulness of "stock water."

The question remains, Is wool-growing as profitable in Missouri as other branches of husbandry? As I am but little acquainted with the people of the State, I cannot point to instances of individual experience to prove that it is so; but, on general principles, I feel safe in making the affirmation. I feel sure that although wool growing has not, perhaps, been pursued on a very large scale, or as a specialty, for but a few years, yet I doubt not plenty of men can be found who can say that their little flock of sheep has paid them better than anything else for the same outlay. That, too, as I shall attempt to show elsewhere, although they have not made their little flock near as profitable as they might and ought to have done.

I know that in treating of the profitableness of wool growing at this time, many of my readers will be turning over in mind the low prices of wool at the present and for a year past. He would be a bold man who should affirm that wool could be grown in these days of high taxes and expenses for thirty-five cents per pound, the price of western wool at this time. However, every one has seen other products bring, when prepared for market, less than the cost of their production; but no one puts that down as true of *all* years because it is true of *one*, or, frequently, of *two* consecutive years. For a year past, not only has the wool grower made no money on his wool, but I am very certain that also the manufacturer who worked it up, and the merchant who sold the manufactured goods, have made no money. Of course, I am speaking in general. The principal reason (separate from the fact of the immense amounts of wools and woolens in the country) I judge to be in the anomalousness of the times—the derangement of the finances of the country. We must offset our thirty-five-cent wool of this year against our dollar wool of a few years since. Manufacturers and merchants, also, must charge up their losses of 1867 to their large profits in war times.

I will give a few reasons why I think the depression in wool growing is about over, and that wool growers are about to enter upon a number of years of comparative prosperity. At the time of this writing (Jan. 4, 1868) there is a better feeling with regard to money matters and business prospects abroad in the country; a feeling that perhaps the present Congress may inaugurate some safe and stable policy in national finances. The fact that people feel good, whether with or without good reason, is always favorable to business—"as a man thinketh so is he." As respects wool growing specially, wool is already doing better in our eastern markets; not, perhaps, selling for much higher prices than through the latter part of summer and fall, but being taken more readily. Some classes of wool, particularly the fine grades and the better classes of medium, are already seen to be scarce, and it is fully eight months before the next clip can be made available. Our tariff has checked the importation of much wool, and it is likely to be retained for some years. Many sheep have been rushed into the mutton market; many, in some sections, have been "pelted"—i. e., slaughtered for their pelts and tallow; many ewes were let to go unbred last fall, which are being fed this winter for market, and many sheep will be lost by death this winter, by men who have "sickened" of the "sheep business," and who, consequently, "hate the sight of a sheep." I judge that the clip of the United States for 1868 will be, at least, ten or fifteen per cent. less than the clip of 1867. Last year's clip is generally estimated at 100,000,000 pounds. We have never yet grown much over half—most probably not to exceed at the outside two-thirds—the wool *used* in the United States; we have never yet grown as high as three-fourths of that *manufactured* in the United States. A pound of American wool was never yet compelled to go abroad to seek a market. Not but that, at times, some small—very small—exportations of certain qualities of wool have been made, but scarcely ever at a profit to the exporter. The fact that scarcely none of our wools go abroad shows that we have, in one agricultural product, about as good a home market as have the growers of the same product in their respective countries—the cost of exportation furnishing no argument to the contrary, in the case supposed, as wool can be shipped for so small a part of its value. This is certainly favorable to wool growing in our country; for we see that in many of our products we are, in a measure, dependent on foreign markets. Take wheat, for instance. For fifty years past (perhaps), whenever an American farmer has cast his kernel of wheat into the ground, from that time on until harvest he has had to keep casting anxious glances across the broad Atlantic, to see if by any good fortune there was a probability of an Irish famine, a wet harvest in England, or a Crimean war, which might make the price of wheat remunerative.

Among the incidental advantages of wool growing may be mentioned the small cost of getting to market. I will not dwell long on this point, as it is obvious to every reflecting mind. With wool at forty cents per pound, two horses will walk off with one thousand dollars' worth as easily as with eighteen to twenty dollars' worth of corn at forty cents per bushel. And, too, here in the west wool has been worth, for sixteen years past, forty cents per pound and upward—more years than has corn been worth forty cents per bushel. The same wide relative difference in cost of hauling the two products holds good equally when they are shipped to a distant market. I shipped wool last year from Central Illinois to New York, by a fast freight line—in the same cars clear through—for a little less than two and one-half cents per pound—by common freight it would have been a little less than two cents per pound. Any one can readily estimate the wide difference in favor of wool over the cost of shipping wheat, corn, cattle, and hogs.

Sheep are pre-eminently the stock for "shrubbing-out" and clearing up rough, bushy lands. By pasturing on such, and particularly feeding on them in the winter, sheep will kill—by barking—alders, hazel bushes, small wild-crab trees, blackberry bushes, etc. In a timber pasture I notice, also, that they cause the blue grass to spread much faster than other kinds of stock. Prairie grass, too, is quite easily killed out by close pasturage with sheep; which is frequently quite an advantage where one has part of his farm "lying out," and which he would like to break as cheap as possible, before fencing it in. On my present farm, which I have made out in the prairie, five miles from timber, and perfectly raw at the time, no stock scarcely even ever having run on it, I broke with two mules and raised a good crop of corn on a piece of prairie, on which I had made a "late burn" the year previous, and which my flock had kept fed through the remainder of the season tight to the ground. The next spring after having made the burn it seemed almost like old ground; the grass roots appeared to have the vitality killed out of them, and were, for the most part, lying on top of the ground—heaved out by the action of the frost. By following the same practice for a few years I think I saved at least a dollar an acre on the cost of breaking.

In much of Missouri there is an advantage in keeping sheep over most other kinds of stock, in the less amount of fence necessary. A slighter made and lower fence than is necessary for most kinds of stock is sufficient to restrain sheep. I speak of *civilized* sheep; I know that no stock exists (save the worthless goat) which is a greater nuisance than some of our long-legged, bare-bellied, hairy-hipped, half-civilized, jumping "natives," which it is almost a misnomer to call *do-*

mestic animals. A fence three and a half feet high ought to restrain any sheep which is worth keeping, and will all such as have had a civilized education. I have owned two thousand to three thousand head of sheep at a time, in which number I have not had one which would clear a fence of the hight spoken of.

Thus much preliminary. I come now to the practical management of sheep. For convenience, I will treat the subject under headings of the different operations necessary to complete the circle of the sheep-year.

TAGGING.

In herding sheep on a prairie range, but few shepherds make a practice of tagging the whole flock before it is turned out in the spring. Flocks are usually turned out about as soon as the new grass barely starts, but are fed once a day, for a while, so that they are brought on to the grass gradually. Then, too, prairie grass is more binding in its nature than tame grass. The common practice is to catch and tag in the fold, before turning out in the morning such few as are scouring. Although the number seems small in comparison with the number of the flock, yet, at the end of three or four weeks, which is about the length of time they continue to scour, I am satisfied that if the number of tagged sheep were kept, the shepherd would discover that he had most probably wasted wool enough to pay for tagging the whole flock previous to turning out. In tagging sheep, after they have commenced to scour, the wool is wasted; whereas, in tagging before they scour, the wool is all saved. In tagging, set the sheep's rump on a low bench, about the hight of one's knee, with its back to the operator; reach over, grasping and drawing the hind legs upward and backward, and shear the wool away from the inside of the thighs and about the arms; if a ewe, then turn her over and cut off such locks as hang from her bag; the object being that the new-born lamb shall not get hold of such in place of the teats. Shear wethers between the inside of the thighs, and also about the sheath—that is, all such as have long belly-wool. With such, if this is not done, wetting the wool causes an irritation, preventing, by a scab on the sheath, the flowing of the urine, so that they sometimes die from its retention. I have frequently lost wethers from this cause.

CUTTING HOOFS.

At this time, also, cut off all long hoofs. A great many, merino sheep especially, grow long hoofs, which turn up in front like sled-runners, impeding locomotion, and causing the subject to "gaunt up" and lose condition. For cutting hoofs, a pair of shears is used made for the especial purpose; the best are like (in fact, are the same) a kind of spring pruning shears, which nurserymen use, that have a movable center working in a slot, thus giving great power, as they cut with a drawing cut. Cutting hoofs, however, is a job which ought to be done at any and all times of the year, whenever needed. Whenever handling sheep for any purpose, particularly in a wet time when the hoofs are soft, have the shears at hand, and cut off the long toes.

HERDING.

Good sheep herding consists, in general, principally in getting the flock out early in the morning, keeping it out late in the evening, and in never rushing the sheep when driving. A flock of sheep ought always to be moved carefully and gently. Never set a boy to herding sheep; if you do, put two men to herding your boy. The only worse thing for a flock of sheep than a boy-herder is *two* boy-herders, each with a shepherd dog, herding the same flock. No matter how good the range may be, the boys, by not getting their sheep out of the fold before nine o'clock in the morning, and in getting them up again by three or four o'clock in the evening, together with divers lively exhibitions of their dogs' driving qualities before every passer-by on the prairie, will contrive to keep them thin in flesh, and in good racing trim.

In a flock of one thousand or more, it is generally better to herd the breeding ewes by themselves, particularly if compelled to raise lambs on the range. In a mixed flock, the wethers and stronger sheep go stringing off in the lead over the prairie, compelling the ewes, heavy with lamb, to keep up with them as they best can, and also to take the feed after it has been picked and run over. In a smaller flock—in which it would not pay to have two herders—let the shepherd keep in front and restrain them from going as fast as they otherwise would.

A prairie range ought to have a flock kept on it from early spring. Sheep will do no good put on a raw prairie range in June or July, which has been unpastured by stock up to that time; the grass has got too big. On a large, virgin range, one can frequently make late burns, thus giving his flock fresh feed later in the season.

A well-trained shepherd dog is almost indispensable in handling large flocks; with small flocks I should prefer, almost, to not have one—so many men and boys are so inclined to make a dog do everything. A shepherd pup should have his training commence at about six months old, and should be trained to mind, to go slow, and to not bite.

FOLDS AND FOLDING.

It is always better, if possible, to not fold sheep, but to give them a field of considerable size, in which to choose their place to lie. In herding on the ranges, however, where it would make too much driving to bring them up close to the house every night, and particularly where wolves and dogs are troublesome, folding is unavoidable; a wolf-proof fold then becomes necessary. Where timber is plenty, a permanent fold may be made by setting posts in the ground, touching each other in line—stockade fashion—or by nailing upright rived pickets, after the usual style of a garden fence. A picket fence, five to six feet in hight, will turn any dog or wolf. Make permanent folds on high, dry, rolling land. For a temporary fold, make some panels of portable three or four-board fence, with narrow spaces between the boards, and nail common plastering laths, some three or four inches apart, to the two upper boards of the fence, letting them project up sufficiently to make the fence about six feet in hight. The strength of the laths makes no difference; neither dog nor wolf will try to jump over or break them. I once nailed on to a four-board-fence fold, into which the wolves came occasionally to kill sheep (although within four rods of my house), common *pine* plastering laths, which were scanty half inch in thickness, and no wolf ever got in afterward. There is a sort of *trap* look about those pickets which deters them. A temporary fold, in which sheep lie every night, should be shifted to a fresh spot once in a week or two.

RAISING LAMBS.

If lambs are to be raised on the range, it will not do in any part of Missouri to have them come until the worst cold storms are over, and there is a good bite of grass. I judge that, even in Southwest Missouri, one without sheds ought not to have his lambs commence coming much before the first of April. I do not advise any one, in any section of Missouri, to undertake to raise large flocks of lambs without sheds of some sort. Those with small flocks have no excuse for not having some kind of shelter, as it costs so little for a small flock. For a makeshift, a shed made with forks and poles, and covered with straw, or still better, long slough grass, will be a great assistance in those bitter, cold rains, which will come occasionally in April, even as far south as Springfield.

It is a hard job to raise lambs out on the prairie; still, I presume in southwest Missouri, by having them drop from the 15th of April to the 15th of May—perhaps even a little earlier—the weather might be good, and lambs get right up and go right along. In raising lambs on the prairie, prepare a number of small, light pens, fastened together at the corners, and scatter them about over the herding ground. These need not be over three feet square, and merely high enough so that a sheep will not jump out of them. Where wolves and dogs are bad, make them of light pickets after the manner I have described for folds. In case a ewe will not "own" her lamb, catch and put her and her lamb into one of the little pens, and happen around a few times a day and catch her and let the lamb suck. A few cornstalks or some brush thrown over these pens is quite a protection to the lamb in case of rain. At some central point in the herding ground, that is, the usual beat of the sheep, have a larger pen made with four picketed panels, some twelve to fourteen feet square. If a number of lambs drop too late in the evening to be worked up to the fold with the flock get them into the pen with their dams. Sometimes some of the small pens may be used for the same purpose, if not occupied; the main use of them, however, being to jail ewes which won't own their lambs, until they can be made to.

The shepherd should always have a sucking bottle in lambing time, from which to feed such lambs as may require it from any cause. A flannel-covered soldier's canteen makes a good one; for by buttoning it up in one's coat milk can be kept in it at the proper warmth for some time. Such ewes as drop lambs in the fold at night may be left in it with their lambs the next day. With ewes in good condition, with good grass and good weather, lambing on the range is attended with little difficulty; but let the circumstances be the reverse, and one may work "like fighting fire" and lose lambs in spite of it. Long years ago, when I was compelled to raise lambs on the range, I used to have all the old coats, pants and vests I could get hold of out on the prairie. If a cold rain or snow squall came up and began to knock over my youngest lambs, I would wrap one in an old coat, another in an old vest, and so on until my stock of old clothes was exhausted. In this way I saved many lambs, and frequently, also, escaped the necessity of packing my arms full off a mile or two to the house.

To exhibit the manner of raising lambs with sheds, I take the liberty to make an extract from an article which I wrote for the Journal of Agriculture in April last. I do not expect that all shall have sheds like mine, or like situated. I calculate that novices in wool growing can gather hints from it from which to deduce plans for raising lambs adapted to their circumstances. It may be, too, that in Southwest Missouri brushy timber pastures, which are quite rolling, and which have deep ravines in them, where sheep can lie out of the wind, obviate the necessity of much shed room. Still, in long-continued cold rains, sheds only will answer the purpose:

"A week or two before the lambs come in, we rig up our yards, troughs, racks, etc. We also contrive to have three or four cows come in with calf at that time of year. In order to have plenty of room about our lambing sheds, so that we can effect a number of divisions of ewes with lambs—which is a big thing in raising lambs—we pick out of the ewe flock at first only such as were 'bucked' the first week, which is known from *the spot*. There will be of them two or three hundred.

"During the day—if not stormy—they run out in one of the yards, where they are fed their hay in racks, and get their water. The shepherd is constantly on hand to see that all goes right. and when in the hight of lambing he has to have an assistant. Such ewes as lamb through the day are got out of the bunch, and with their lambs are fenced off to one end of one of the sheds, and are looked to, to see that they all own their lambs and have milk. We provide ourselves with a lot of India-rubber nipples from the drug store, which we slip on the necks of our milk bottles. If a ewe appears to have no milk at first, we suckle her lamb the first two or three times on a ewe which dropped a lamb about the same time, and which has plenty. Then we suckle it from a bottle of new cow's milk, in which we put a little molasses to keep it from making the lamb costive, which cow's milk is apt to do, particularly when a cow is not very fresh. Many ewes, which have not any, or but very little milk, will frequently spring a little in a day or two. If we have a ewe which is dry (yearling ewes, and very old, or poor ewes, are most apt to be so), we put her lamb on some other ewe, which has lost a lamb from any cause, but which has plenty of milk.

"To make a ewe own a lamb, put her with it in a small pen; come around and hold her four or five times a day, to let the lamb suck. Two or three days of this treatment is usually sufficient to make a ewe adopt a lamb. Skinning her own dead lamb, and putting the skin on the one to be adopted, will usually make her 'take to it' right away. In two or three days the skin may be taken off. It is not necessary to take off the skin from a lamb entire; take off the body and sides; cut a slit in it to slip it over the lamb's neck, and fasten behind. Frequently if a lamb comes dead, or if it died when but a day or so old, drawing the live lamb across the ewe's *anus* two or three times, so as to get her own scent on it, will make her adopt it immediately.

"During all bad nights all, both ewes with lambs, and ewes not having lambed, are shut up in the sheds. I do not have a shepherd stay in the shed at nights; for I have noticed that poking around among them in the night with a lantern does more harm than good. In a large flock we frequently have from twenty to thirty-five lambs come in a night (from forty to seventy every twenty-four hours), so that stirring around among them at any time in the night, the freightened sheep (no matter how tame and quiet a flock may be), crowd from side to side of the shed, and ewes just having dropped lambs are crowded away and separated from them, perhaps not to find them again under an hour or two, if at all. Then, too, the flock tramples all over them. Frequently a lamb might be saved by the shepherd being on hand just at the right time of the night to attend to it; but in good sheds, inclosed at all sides, and not too full of sheep, the gains of such lambs would not more than balance losses from general disturbance by poking around with a lantern.

"The shepherd, on going to the shed in the morning, opens the doors and lets his flock pass out into the yard (the lambing flocks). Looking in he finds a lot of lambs, which have dropped through the night. Their dams will generally stay in with them, but on counting, perhaps he finds more lambs than ewes. He then goes out into the yard and picks out such ewes as he discovers, by their looks, have dropped lambs. Putting them into the shed with the lambs, he watches them pair off. If one or two ewes fail to show any acceptance of lambs, he takes such as are unowned and puts up in one of his little pens, each with a ewe, and keeps them in with them until he makes them adopt such lambs. Those ewes which drop lambs in the night, so also such as drop lambs through any day, are kept by themselves in one end of the sheds twenty-four hours; after that time they are put with the older ones. Ewes with lambs are kept sorted out from the main flock as fast as they lamb.

"Ewes with lambs we feed shelled oats and bran mixed. Until they drop lambs, such as are to lamb first, and are about the sheds, are fed hay in racks and corn in troughs. The main flock of ewes which are supposed to be out in a feed-lot are fed shock corn, or hay and corn, or such other feed as we may be feeding the 'dry flock,' or the lambs or wethers at that time. The 'feeder,' proper, is the man who with a cattle team feeds the most of the sheep. The shepherd does merely the feeding of his bunches in and about the sheds. The sorting ewes and lambs, suckling on sheep (catching a sheep and suckling), the suckling from his bottle, the carrying of chilled lambs to the house once in a while to warm them up, the watering, feeding, etc., etc., keep one or two men as busy as they can be from morning to night.

"After we have got about two hundred lambs about the lambing sheds, they are taken to the third shed which I have spoken of as opening into a large pasture from each end. If grass has started and the weather is pleasant they run out in one of the pastures; if not, they are kept up in it and fed dry feed and watered. In case they are on pasture, and there comes a cold, stormy day, as frequently happens in April, and generally in this latitude one or two more such in May, they have to be got up and kept in the shed until it is over. It is nearly always safest, if the weather is at all uncertain, to get them up nights.

"By this time two or three hundred more ewes are ready to come up to the lambing sheds, such as their *spot* shows were bucked in the second week. The same process is gone through with them, and when about two hundred of them have lambs they are taken to the third shed, and turned into the other pasture which opens out from the other end of the shed. This shed is then divided with a panel or two of portable fence, so that the two flocks may be turned into the shed without mixing.

"By the time the bad weather is past, and these two bunches of lambs are some two or three weeks old, they are turned together so as to have one of their pastures for the younger lot of lambs. The idea of keeping them separated as much as possible when young is so that ewes won't 'lose' their lambs. In large flocks of ewes and lambs, particularly if the lambs are all young, many ewes, from carelessness or timidity or other cause, are liable to forget which lambs belong to them. Ewes tell their lambs, until at least a week old, not by sight or hearing, *but by smell alone.*

"The flock or flocks at this third shed are looked to two or three times a day to see that they keep paired off right. Such ewes and lambs as have been paired by adoption, we frequently mark with red chalk on corresponding parts of their bodies, as they are quite liable to become separated on account of the ewes 'going back' on the lamb when allowed the freedom of a pasture."

DOCKING AND CASTRATION.

This job ought always to be attended to when lambs are not to exceed four weeks old; and would, perhaps, be better if done when younger. Except in very large flocks, however, it is usually made one main job of—picking up what lambs come afterward as convenient. The ewe flock should be got up carefully and gently into a shed or yard in the morning (a cool, cloudy day is best, as they bleed less), the lambs picked out and put by themselves. The shepherd, who is the principal operator, has two knives convenient, one to cut tails and the other pouches. His assistant catches the lambs and brings them up; if a buck lamb, he grasps the four feet in his hands, drawing the hind legs firmly upward and backward, holding the lamb high up and tight against his breast with its back toward himself. The shepherd seizes the end of the pouch with his left hand, gives a draw on it, then cuts square off, at a stroke, about two-thirds of the pouch, and draws each testicle right out, string and all. The assistant then brings the lamb down to a "present arms," turning it over and presenting the rump to the shepherd, who grasps the tail and cuts it off with his other knife within an inch or two of its root. Then picking up the spring punch (something like those railroad conductors use to punch tickets) he marks the lamb with the ownership mark. These punches make a ⅜-round hole, and by putting on the edge of the ear are made to cut half-round notches. Any one can see that with such a tool various marks can be made. Ewe lambs, as they are caught, are docked and ownership marked. In castrating, the most of our foreign shepherds, who are not usually squeamish, draw the testicles with their teeth. They can draw them twice or thrice as fast as a man can with his fingers. The bucktails and ewetails are thrown in separate piles so that one can know about how the sexes are running. In a good many years' counting, I have never found them in any crop of lambs to vary but little.

The object of cutting lambs' tails off is that they may not help to hold a mass of filth (when sheep scour) under which maggots breed, and, if not attended to, kill the sheep. If lambs, from any chance or carelessness, are not castrated until quite warm weather, the pouches ought to be smeared with pine tar with a little turpentine in it, to prevent them becoming fly-blown. I will mention here that the safest way in which old bucks can be castrated is the one described above for lambs. Merely cut off a big end of the pouch, take hold of the testicles and draw them right out, cords and all.

After the castration and trimming, the lambs had best be left with their dams, right there, for a day or so. Driving would make them bleed worse.

WASHING SHEEP.

There are various methods of washing sheep practiced in different sections of the country; the oldest, and perhaps even yet the most common, method being to take sheep into a stream or lake, and wash them by squeezing the wool with the hands. In hilly sections, where the spring branches have considerable fall, water is carried in troughs until about two feet of the fall can be got directly on the sheep. Beneath the spout, some have a tank large enough to hold three or four swimming sheep, while one is being turned about under the spout by two men. In some cases the tank is omitted, and there is merely a platform beneath the fall.

The best method—the easiest, the cheapest, and the cleanest by which sheep were ever washed, is by swimming them three times across a running stream, with an hour's interval between swims. At first sight, this seems, to almost any one, a careless, lazy, and dishonest method; it seemed so to me when I first heard of it. A few years' trial of it, however, has taught me that sheep cannot be washed any cleaner, even by "spouting," which is generally considered the most thorough manner. Sheep might be but half washed by swimming—by but half swimming—so they may be poorly washed by any other plan; but one thing is certain: if sheep are swum as I describe, their cleanliness is not dependent on the contingency of having faithful hands—as in other cases—they are bound to be well washed.

To wash by swimming, make a yard on the bank of a running stream with depth and width sufficient to swim sheep at least a rod in crossing from one bank to the other. Choose a spot for your pen on that bank of the steam close to which the channel runs, and which is deep enough to swim a sheep close to the bank. Opposite, the water should grow gradually shallow, shelving up to the bank, with a gravelly bottom to go out on. Get your flock started by throwing in a few and getting the rest to follow. To get a flock to take water the first time is the only trouble. One large flockmaster told me that he even did not make a yard, but got his different flocks carefully and gently down to the water's edge, then having attached long cords to two or three of the leading sheeps' horns or necks, waded across, and from the other side drew them slowly and gently into the water—thus tolling the flock over.

To return to our swimming After the flock has been swum once, bunch the sheep in the hot sun and let them stand from half an hour to an hour. It is generally most convenient to swim the sheep from the same side of the stream each time. With a stream of convenient width, one can usually find a shallow place, above or below the swimming place, where they can be waded across. It frequently so happens, also, that one can find a good place for the work near a bridge, which they can cross.

The philosophy of washing sheep by swimming is that the *oil* in wool—as it is called—is a natural soap; once swimming soaks the wool somewhat, and the second and third swimmings clean the filth out of it—on the same principle as drawing a well-soaped, dirty shirt through the water cleanses it. In addition to my three swims, I am, individually, so situated that I get two wades additional; thus getting the dirtier parts of the fleece—the legs, belly, and flanks—well soaked.

Were I so situated that I could not wash by swimming, I should shear without washing. Many of our largest flockmasters in Central Illinois, who have been shipping their wool, unwashed, to New York, for three or four years past, say they think they get fully as much for it as if washed. There is freight to be paid on some dirt, to be sure, but it is no great things on the pound of wool.

SHEEP SHEARING.

From the northern to the southern sections of Missouri, sheep should be washed from the 10th of May to the first of June, and shearing should commence in from six to twelve days thereafter—depending on the weather. If quite hot, five or six days sometimes suffice, but if cold and cloudy, it is frequently ten to twelve days before the oil starts into the wool again. The proper time to shear is when the oil has started barely sufficient to give the wool its natural lively look; previous to that time, it has a harsh feel and a straight, cottony look, with scarcely any crimp. If left to get too oily, buyers make a heavy discount on it; rather than have it thus, better shear without washing.

Sheep shearing is usually done in a barn, stable, or temporary shed erected for the purpose. In a large flock, kept in separate divisions, shear the breeding ewes first, as carrying a hot fleece and suckling lambs is very hard on them. Have a shed, if possible, large enough to run enough sheep under for a day's shearing in case of a rain.

Shearing is always done by the head, in the West; in the East, usually by the day. In the West there are comparatively but few men who know how to shear; so that, in general, sheep are pretty roughly shorn. "The higher the wages, the worse the job is done," is true of it as of other things. In war-times, when ten cents per head was paid, and good shearers made their five and six dollars per day, the job was done a little worse than usual.

The owner of the flock usually ties up the wool, keeps tally, attends to cutting off horns, spotting culls, etc. Tying up is mostly done with various styles of boxes which put fleeces up in a uniform shape and size, and in a little more artistic manner than even an expert can do by hand. A nice handling and tying up will make a clip sell for two or three cents per pound more than would the same clip tied up in a bungling, ragged manner. The box I use, to describe it in general terms only, is, when open, a table, on which the fleece is spread; when closed up, by turning up the sides on hinges, a box, into which the fleece is compressed into a compact mass of wool of ten inches square, and so deep as the size of the fleece will make.

Have a fine-toothed, small, stiff-back saw convenient, with which to saw off all horns which turn in a direction to grow into the sheep's eyes. Many merino wethers' horns turn in a direction to put an eye out, if not sawed off. By attending closely to the yearlings, from year to year, there will be no further trouble with the same sheep. Keep the toe-shears near to cut off long toes. Have, also, a pot of paint sitting on the floor, with a stamp in it with the owner's initial letters cut on it, and have each shearer stamp his shorn sheep before turning it off the floor. It is very important, in all large flocks, to not only have an ear-mark, but also to have them plainly marked with paint at all times. It is not necessary, in ear-marking, to cut the ears all to pieces, as is frequently done; any man with a little ingenuity can contrive a mark which shall answer the purpose, and yet not spoil the looks of his sheep. Some of our large sheep-owners in Illinois brand their sheep with a small letter on the side of the nose. Keeping sheep plainly marked with paint (renewing the mark at different times of the year) is particularly important where different flocks are herded on the same range, and liable to get together at times, saving much time, trouble, and, sometimes, hard feeling, in separating sheep.

One of the most important things to be attended to on the shearing-floor is to watch out for, and "spot" (put a paint spot on), all such as ought to be got out of the flock. At this time one can tell better about the shape of the sheep and its fleece, can see the faults easier than at any other time in the year. A man should spot long-legged and bad-shaped sheep; broken-mouthed and old sheep; light-shearing sheep; bare-bellied and thin-fleeced sheep; ewes with spoilt, or partially spoilt bags; ewes which are known to be poor nurses, and whose lambs, for a year or two, are known to have been given to other ewes to raise; wethers which are three years old, and which shear so light that the butcher had better have them, and, if trying to breed common, coarse sheep into fine-wool, all the coarse, hairy-hipped sheep. No man will ever get a *first-rate*, *even*, *profitable* flock of sheep who does not make a practice of *yearly* culling.

Before turning bucks off the floor, daub them well behind, and under the horns with pine tar. This will prevent the flies blowing them, which they frequently do in hot, damp weather, being attracted by the stench. If fly-blown, and not attended to, the maggots will kill them. In case maggots, from any cause, get a lodgment, scrape them all out, and rub the parts with turpentine.

Sheep are well shorn when the wool is cut smoothly, evenly, and close to the skin; the head and legs trimmed smoothly, the sheep not cut up, and the fleece brought on to the table broken but little. One can sometimes come a little closer to having it done in this manner by praising the nearest approach to it, and by stepping up by times and watching "the boys;" still, if you find a hand will persist in leaving about three times his wages on the sheep—notching up the sheep's side, and occasionally cutting pieces out of the flesh large enough for steaks—better count up his tally, and pay him off. It is a curious circumstance that, although each hand chooses his own sheep, yet the poor shearer complains that he always gets all the kicking sheep!

In case a vein is cut with the shears (which frequently happens, even with care, on the belly, as the veins come close to the skin, and some old sheep's skins tear as easy as paper), put a pin through the two edges of the cut so as to leave one-fourth inch or so of the pin project each side; then wrap a lock of wool tightly around under the two ends of the pin a number of times.

Sheep must not be shorn when wet, nor must the fleeces get wet when tied up. In the greater part of Missouri it will most probably be as well to sack the wool as shorn. Where one has any chance of selling at his barn, the better way is to pile it up nicely in bulk where a buyer can see it. Within a few years, however, wool buyers (manufacturers) have made it the law of the trade that we shall carry our wool to them; at least send it to commission houses, which amounts to much the same thing. If one can, he had nearly always better sell at home; if he cannot, then get the best information he can with regard to different wool houses, shut his eyes, and send it to the one of which he gets the best report by wool growers whose clips the house may have sold. In nine years out of ten the best time to sell is as soon as possible after shearing.

WEANING LAMBS.

The general intention of flock owners is to wean at four months old, but various circumstances occur to make quite a difference in this respect. The careless, easy man, who is generally about a month behind in everything, has not got his fences made ready, or his grass bought (if he has not of his own), or "has not got time to attend to it," so that perhaps his lambs run with the ewes quite late in the fall, making it impossible for him to enter them into the winter in good shape. Then, too, his ewes, from suckling so late, come slow in heat, thus causing his next crop of lambs to come stringing along two or three weeks longer than they ought.

Where a flock is herded on the prairie rather early weaning is preferable; say wean April lambs by the tenth to fifteenth of August, instead of waiting until the first of September, as is usually done. By the middle of August prairie grass is getting dry and hard, so that ewes are giving only about milk sufficient to keep the lambs from eating much grass. Wean on the best and freshest (not too large) tame pasture; the fall feed of meadow, or a "rested" pasture; that is, a pasture from which stock has been withdrawn for two or three weeks. I wean my lambs in the same pasture in which they have run during the summer, the flock having been taken out two weeks previously, so as to have the grass fresh. The lambs feel more at home in it, and do not wander about as much as they do in a strange pasture. If the country is too new for tame grass pastures, sow rye in the corn, on laying it by, and wean in it. The lambs will eat but little of the corn for some weeks, and will usually become accustomed to it so gradually as not to founder them; however, they will sometimes, more readily if large, strong lambs. In such a field is a first-rate place to winter a flock of lambs; gathering out, if one wishes, the most of the corn, but leaving the small ears. The same rye field may be used the next spring to turn ewes with young lambs into in March and April, and, if one wishes, can then be broken up and planted in corn, or left for a crop of rye. Always put a few old ewes (which are not suckling) in with the lambs, to help to flock them, and to keep them from scattering as much as they otherwise would. Look to the fence, also, to see that lambs cannot crawl through, as they are very uneasy, and go looking into every corner. At weaning time, also, pick out and sell to some one, at some price, the small, late, unthrifty lambs, of which there will always be some in any flock.

BREEDS—BREEDING—BUCKS.

As my personal experience has been wholly with merino sheep, I shall not attempt to treat of other breeds at much length. Sheep may be divided into two leading divisions of fine-wooled and mutton sheep. It is near enough for general purposes to say that the experience of the whole country has decided the American merino and the cotswold to be the best representatives and the most profitable breeds of these two divisions—*for American uses.* Various English breeds—Leicester, South Down, Bakewell, Lincoln, New Oxfordshire, and cotswold—have been imported at different times for the past fifty years. These breeds, for varions reasons, have not been as widely disseminated, and—judging from that very fact—not so generally approved by our farmers as fine-wooled sheep. I am inclined to believe one great reason of this to be the—until lately—general American notion that somehow sheep ought to thrive and yield a profit almost without care or feed.

I shall give what I consider the principal differences in the two breeds named above and the circumstances which ought to govern one in deciding which breed he should keep. The cotswold is a large, hardy (for an English breed), prolific sheep, and bears a fleece of combing wool of from six to eight inches in length and weighing, in well-kept flocks, from seven to twelve pounds to the fleece. Like all the large English breeds it will not bear heavy stocking—i. e., keeping in large flocks—and must have big grass in summer and heavy feeding in winter. I think, too, that, to bring out their greatest excellence as mutton sheep, perhaps they ought to have roots in winter. There should be but few of them kept together, particularly in the winter. They require much longer grass than the merino or the roving native. They cannot travel far, and ought to be on large grass, so that they may fill themselves on a small space of ground and then lie down. I have been told that in England they are put on pastures in which the grass is as high and as heavy as in our meadows at mowing-time. Merinos will almost starve if put in such large grass—at least they will do but little good. I have noticed that in fall-feeding meadows with merinos, if there was a part of the field not mowed they avoid it altogether, and can scarcely be driven into it until the shorter grass is fed tight to the ground.

It is not natural for the cotswolds to herd together. Englishmen tell me that in " the old country" when three hundred to four hundred cotswolds run in one large pasture, they will be seen scattered about all over it in small groups, scarcely ever over four or five together. The cotswold, moreover, cannot stand sudden changes of weather near as well as the merino. They are much subject to colds in winter, and if not properly kept are terribly " snotty"—a nasty word, but expressive.

The two principal conditions under which the cotswold would be the breed to keep are these: First, where one wishes to keep but few sheep—at least not what would be called a large flock—and is convenient to a large city, or other good mutton market; second, when he feels that he would give them all the care necessary to bring out their excellencies. On a large, new range four or five hundred cotswolds might, possibly, be herded together and do well; but when range begins to become circumscribed, and so much stock runs on it as to keep the grass short, they will fail to do well even where a flock of one thousand merinos would keep in first-rate condition. In two or three instances where I have seen cotswolds and merinos herded together, I have noticed that the former are thin. So, too, to take and put a little flock of natives—which, running by themselves, are as fat as hogs—in with a flock of merinos will make them, in a few weeks, as gaunt as hounds. I suppose, however, part of this effect is justly to be charged to the bad effect of the merino smell; still the fact remains that they cannot bear close herding.

The high price of combing wool, which has obtained within quite a few years past, and which is likely to continue, has made the cotswold much more profitable than formerly, and much attention is being turned toward the breed at present. Not such a great many years since, when merino wool (western) was worth forty-five cents per pound, combing wool—then classed with native as merely coarse wool—sold at only about the same price of native; say at from twenty-five to thirty cents per pound. The present price of combing wool has no connection with any war demand or war prices, but is caused by the fact that we have in this country a new class of manufactures, made of these wools. The supply of combing wool is even yet quite small in this country, and manufacturers get much of their stock from Canada. Under our present tariff, it pays a duty of ten cents per pound, and an *ad valorem* duty of ten per cent. additional. With western merino, worth in New York at this time from thirty-five to forty-two cents, combing is worth from fifty to sixty cents, bringing almost the highest prices of any wool. Formerly the cotswold raiser had to look to his mutton pretty much altogether for his profits; now he has an additional profit in his wool. In case the present tariff is continued—as I think it will be—the grower of combing wool will be, I judge, dependent on fewer contingencies, and will get better and more uniform prices than the grower of fine wools.

I will dismiss the comparison of the merino with cotswold in few words. I have endeavored to give a fair representation of the merits of the cotswold, and have taken up considerable space in treating of that breed, that it might not be thought I gave my own breed undue preference.

In short, then, the merino, as compared with the cotswold, will bear keeping in greater numbers and closer stocking; can also be kept on shorter grass, and can travel further for its food. It is, I think, eminently the breed to keep when one wishes to make a business of sheep husbandry, and particularly a large business. It is the best breed, also, for a new country, where outside range is plenty and where the distance is too great from large towns or railroads. With poor care (which I do not countenance) the merino will thrive much better than the cotswold.

A few words, at this point, on breeding. With the most of men who will engage in sheep raising in Missouri, breeding will consist principally in crossing inferior or grade sheep with a pure breed on the buck's side. The first great point in crossing is to get a clear idea of what one wishes in the way of a sheep, and then to breed persistently for it. Some men practice a sort of indiscriminate crossing, erroneously supposing that there is some hidden, mysterious virtue in a cross of itself, or else that breeding is a matter of blind chance, and they toss at random for prizes. Should one wish to breed native or merino grades into cotswold, all he has to do is to get the best full-blood cotswold buck obtainable, and breed his ewes to him. Among his ewe lambs he reserves for breeding, from year to year, only such as take strongest after the better stock. A few years will find him in possession of a tolerably even, high grade, and profitable flock of mutton and combing wool sheep. So, also, in trying to breed the same flock of native or low grade sheep up into merino. In case one's flock is so large as to require a number of bucks, he ought always to choose those of one general character, as near as may be. It used to be thought that, in case one's flock was very uneven, he could get them even sooner by having bucks of different character, and serving the ewes to such bucks as would best counteract their faults. All experience has shown, however, that the desired result can be effected sooner by choosing such bucks as you wish your flock to resemble, and to breed to the ewes just as they come. Better bucks to be obtained, if possible, from year to year, but to all be of the same general character in form, fleece, etc. One can frequently breed a flock of the poorest natives to a full-blood merino buck, and the first crop of lambs shear from one to two pounds of wool per head more than the original stock. This increase in wool, together with a gain in other particulars, will continue after each cross; not, of course, in so great a ratio as in the first and second crosses. The higher the stock is bred, the less the per cent. of gain in each cross, and the more judgment and discrimination does it require to breed in such way as to make even a small gain from year to year. To use with common coarse sheep, or with low-grade stock, one needs a short-legged, heavy-bodied, rather light-wooled and tolerably greasy merino buck. These points are necessary to counteract the most usual faults of common, low-grade sheep; these faults are: too long legs, too slim bodies, too thin fleeces, and frequently—when the sheep have attained some age—a total want of wool on the belly. Never use a grade buck to never so poor ewes, if possible, to obtain a full-blood. A full-blood merino buck, worth from $30 to $60, will almost pay for himself in increased amount of wool on his first crop of lambs got from one hundred of the poorest ewes in Missouri.

Let no one think he can combine all the good qualities of mutton and fine-wooled sheep by two or three crosses; as well try to combine the peculiar good qualities of the blooded horse and the Suffolk punch by one or two crosses of those breeds. It can't be done. We "can't sell our cake and eat it too;" we must take mutton and go without fine wool, or *vice versa*.

COUPLING.

Bucks ought to be kept by themselves the year round, except when serving ewes, which period ought not to exceed five weeks. In large flocks we prefer that ewes should go dry rather than have lambs stringing along two or three weeks after the greater part of the crop may have dropped. "Better a dry ewe than a June lamb," all good shepherds say. Letting the buck run with the flock the year round, as many of our farmers do with their small flocks of sheep, is an abominable practice. I will remark here that a friend who has gone into Southwest Missouri with a large flock of merino sheep writes me that the practice just mentioned is a great trouble to a man who undertakes to keep sheep anywhere near the settlements. If he is not constantly on the *qui vive* the first he knows a half dozen common, coarse, hairy bucks are charging around in his flock. To any man with a good flock of merino sheep, the damage which two or three such bucks might do him in a few hours, would be not less than one hundred dollars. Were I compelled to herd in such a neighborhood, I would propose to my neighbors that I would pasture their bucks through the summer for nothing; or, if they would not keep any bucks, I would furnish them with the use of much better ones than theirs at the right time of year, gratis.

No one with a flock of fifty head and upward ought to turn his buck in to run with his ewes. With a small flock, the best and easiest plan is to get the sheep up in the morning, turn the buck in, and when he has served a ewe, catch her, put a paint spot on her and put her out of the flock; and so on, as long as ewes can be found in heat. In all cases let the buck serve a ewe but once, which is as sure as twenty times. If ewes are found in heat pretty fast, let the buck rest between service.

To show the general management in large flocks, I copy part of an article written for the Journal of Agriculture last fall, detailing my last fall's procedure in bucking:

"Yesterday we got up the 'dry flock' (wethers and dry ewes, together with young ewes never yet bred), and sorted out of it all the breeding ewes. The most of these were two-year old ewes. I do not breed yearling ewes; my ewes are past two years old the fall they are bred, and, of course, three years old in the spring when they drop their first lamb. In large flocks (scarcely in any, large or small) it does not pay to breed yearlings, for several reasons: first, you hurt the growth, and ultimately the size of the ewe; second, she generally brings a small lamb; third, she will not 'own' or look after it very well; fourth, she is a poor nurse, and usually gives but little milk.

"On the 15th of October we commence bucking our full blood ewes, the lambs to come in the corresponding time in March. This is too early to breed the grade or wool-growing flock; but having but one hundred full blood ewes we can give them plenty of shed room, and afford to take more pains with them. This flock is served by my two best stock bucks. Each ewe has one of Dana's metal tags in her ear, with her number on it. Such as are served by each buck are spotted with paint on a particular part of their body. The shepherd gets them up every day and serves so many as are in heat, each being served but once. After about the first of November the grade flock is put through much after the same way, the only difference being that the shepherd turns in three or four strongly aproned "teazers" to search out such as are in heat. When they are all found he turns the main flock back to the pasture and serves his selected ewes. Turning a ewe out into a little alley (in one of the sheds) which runs down in front of the buck pens, he lets out such buck as in his judgment will make the best cross on such ewe; when served he puts his buck back into his pen, spots the ewe and turns her out. In a flock of a thousand breeding ewes this job will keep a shepherd pretty busy a good share of the day. It may look to some like a good deal of trouble when it seems so easy to turn in a lot of bucks, but a little reflection will show that it pays. To 'turn in' with one thousand ewes one would need at least fifteen good, strong, two-year old bucks. At the expiration of five weeks (which is as long as they ought to be in) they would be badly used up—perhaps two or three of them would die in the winter, despite the best of care. What sort of breeding would one get who let the bucks do indiscriminate crossing? If your ewe flock was pretty uneven, and your bucks somewhat various also, you might practice turning in a thousand years and yet be just as far from getting up an *even* flock (which is a great desideratum in wool growing) as at the beginning.

"On the other hand, by 'standing' your bucks, you need only half as many of them (I have frequently got two hundred lambs from one buck), your bucks do not get run down, your lambs come stronger, and you can control the breeding. With a small bunch of sheep one might get them up into a yard once a day, let his buck *serve once* such as are in heat, spot them and turn back into pasture, and yet not be over an hour in doing it. The object of spotting is to show which have been served. Ewes stay in heat about twenty-four hours, so that sometimes when got up the next day a ewe will still be found in heat which was served the day before. Were it not for the spot one would be serving her the next day, which would be superfluous.

"Now, then, supposing all this to be a great deal of labor and trouble, it is by labor and trouble that money is made in wool growing. It is not often in this world that we get something for nothing. I have been practicing this 'standing bucks' for fifteen years, and I have been able to see an improvement in every crop of lambs I have raised. Of course I aim to keep getting better and better bucks."

SELLING CULLS.

After weaning lambs the cull sheep—those spotted on the shearing floor and the small, late, unthrifty lambs of which I have spoken—should be picked out and put on the best pasture. It is well enough, also, to look over the flocks again and see if there are others beside the spotted ones which ought to go out. When they have got up in good order, sell them to whomever you can. I do not mean that any deception shall be used; sell them for what they are—cull sheep.

Many men have got into good and large flocks of sheep by starting with culls. The important thing in buying such is that a man shall not buy too many of them, and shall give them extra care. However, culls are the sheep to sell, not to buy. Never buy such if you are able to buy better ones; particularly, if inexperienced in the management of sheep and wishing to buy quite a flock, let culls alone. I sell mine every year for the best offer I can get, but I always sell them. However, I have practiced yearly culling for years, so that my culls are not such very bad sheep. One great cause of so many new men in Illinois and Iowa sickening of sheep in the past two years is because they bought at high prices large flocks of hard-driven Michigan cull sheep. During the war prices of wool and sheep no man scarcely would sell any part of his flock but culls. No old sheep man will, at any time, whether wool is high or low, allow a man to pick his flock at any price. Such men usually sell but three classes of sheep—cull ewes, cull lambs, and wethers.

In case it happens that one sell his cull ewes, he, perhaps, can put them out on shares, giving some poor man a good lay on them to induce him to nurse them well. In case this cannot be done, kill immediately and take the pelts off such as show plainly that they stand but little chance to go through the winter; then let the rest go unbred and fatten them. If many of them are quite old and getting broken-mouthed they must be fattened mostly in the fall, on good grass, by giving them cornmeal or shelled corn with their pasture.

This culling is one of the most important things connected with keeping sheep, particularly large flocks, and I always feel as if I could not dwell on it too strongly. By it one's flock is always growing better and more profitable; the loss of sheep by death is less, the per cent. of lambs raised is greater, the average weight of wool to the sheep is greater, to say nothing of the increased satisfaction of handling and looking at such a flock. Let a man start with ever so good a flock and run it along four or five years without culling, and it will have the appearance of being composed of "old rips." Let him cull his flock one or two years and see the difference, and there is no danger but that he will continue the practice ever after.

GENERAL FALL MANAGEMENT.

Lambs, even if on good grass, ought to be fed much sooner in the fall than old sheep, and much sooner than many men think necessary. By the first of November, at least in the central and northern parts of Missouri, lambs ought to be fed some grain, even if on pretty good tame pasture. I put troughs out in my lamb pasture, raised some sixteen inches from the ground, so they shall not be jumping into and over them. To get them started to eating, I put some bran and shelled oats in them, sprinkled over with salt. In salting lambs the first time or two after weaning, it is best to salt quite lightly; otherwise some of them may set themselves to scouring. I have known lambs killed by heavy salting immediately after weaning. When running with their dams many of them have not become used to it, because the old sheep get the most of it. After getting lambs to eating oats pretty well I commence feeding part corn; gradually diminishing the oats and increasing the corn, as corn is my principal feed. Lambs must have extra care the first fall and winter to make good sheep of them. One of the noted breeders of England, on being asked how he got up so fine a flock of sheep, replied, "I take care of my lambs, sir."

Sheep must not be left out on the range too long in the fall without being fed. From latitude 38° to the Iowa line sheep ought to come in off the range from the 15th of October to the 1st of November, depending somewhat on the season, but more on the kind of range. If there is considerable blue grass on a range one can stay out two or three weeks longer than on a raw prairie range. In Southwest Missouri, I judge that on many ranges next the farms where the blue grass had "come in" pretty well, one would need to feed but little up to Christmas. There might come two or three days at a time when snow would lie on the ground, when it would be necessary to feed. In such case I should prefer sheaf-oats or hay to corn. If fed much corn, not as yet having been hardened to it, some of them might founder.

In Central and Northern Missouri, if one has no tame grass to come into, he can prolong the herding season frequently (unless snow falls) by feeding grain once a day, and herding on the range. Although the grass may be frost-bitten, the sheep will still find something for roughness, and the grain will "keep the heart in them." In this way, also, one can get his flock corn-hardened before he has to bring it into the feed-lots for the winter. This commencing to feed early in the fall is a very important matter. It is more than half the battle to have sheep enter the winter in good condition. "Well summered is half wintered;" but about two-thirds of men never learn it.

Men with large flocks of sheep ought not to expect to go through the winter by feeding as little as men do small flocks. A small flock, with a large territory to run over, will always get a good living whether fed or not, but it is a different thing with flocks of from one thousand to five thousand head. Statements of men living in Southwest Missouri, as to how little sheep have to be fed in that section, must be taken, by men with large flocks, *cum grano salis.* I doubt not, small flocks of sheep winter there without being fed; one should bear in mind, however, that they not only roam over a large range, but also frequently over the owner's farm and those of his neighbors.

But, no matter what the section of country, or what the range, the main question is, Are they doing well without being fed? If not, they must be fed.

RACKS—TROUGHS—PORTABLE FENCE—SHEDS.

For feeding hay, straw, sheaf-oats, etc., racks are indispensable. If the ground is the least muddy when hay is fed on it, sheep will not, after running over it once, eat but little of it. The best rack for general purposes is the so-called common box-rack. This is an oblong, box-like rack, from twelve to fourteen feet long, and two and a half feet wide. The frame of it consists of six posts, two at the ends and two in the center, of 2x4 pieces, thirty-two inches long. Nail to each side of the frame a board a foot wide, within two or three inches of the ground; leave an eight-inch space, and nail on a board at the top of the posts. Nail two boards of like width, and with the same space, between them, across the ends of the frame. Stiffen the middle of the rack by nailing a stay across it from the two center posts. This is much better than a sparred rack. Sparred racks, as usually made, consist of a long pole set on short legs, into which (the pole) inch and a half holes are bored, angling from each side, about four inches apart. Spars are driven into these holes, and also into a 2x4 scantling, bored with like holes, at like distances apart. Out of such racks sheep twitch a lock of hay, eat part of it, drop the rest under their feet, and twitch out a fresh lock. They also get much hayseed in their necks and backs. With the box-rack they put their heads in at the space and eat, not daring to draw them out for fear other sheep may crowd them away.

For feeding shelled corn or shelled oats in three-cornered troughs, made by nailing two six or eight-inch boards together at the edges, answers the purpose; but for feeding corn in the ear, square troughs, ten inches in width and six in dept are better.

All sheep men ought to have some kind of portable fence. The panels of all are made on the same general principle—four boards, with the proper spaces between them, being nailed with wrought nails, and clenched on three cleets at right angles to them, one at each end and one in the middle. There are various devices for setting the fence up—some straight, supported by bases at right angles to the fence, and others by locking the panels with a "worm" in the line of fence. Some of these fences are patented, and others not. They come in play for numerous uses on a sheep farm, for making yards for catching sheep, for temporary folds, for pens, for fencing stacks, etc. I make my panels just high enough so that they will just fit between the standards of my wagon when laid down. This does not make a very high fence, but will turn any sheep I have.

I consider sheds indispensable in the greater portion of the State, and am inclined to believe some shed-room would pay even in Southwest Missouri. The great and paying use of sheds is not so much in the shelter afforded in the winter as in raising lambs in the spring. There is no spring when a good shed would not pay a man with a few hundred ewes, in the increased number of lambs raised. Quite frequently one year's use of a shed will pay the cost of it. It would be no use to try to raise April lambs (always better than May lambs), in the northern half of the State, without sheds. There are a few nights in every winter when it sets in raining, turns to sleet and snow, and freezes hard, when sheds pay a big interest on the cost of them. Sheep unsheltered in such a storm will get a backset from which it will take them two weeks to recover. I have three sheds, nearly one hundred feet long each; two of them with board roofs, and twenty-six feet wide; the third with shingle roof, and twenty-eight feet wide. The sills of each are laid on stones at about every twelve feet. The roofs are made pitching both ways, and the outside wall seven feet high at the eaves. From the hight it is to be seen that I do not expect to feed largely under cover. As I consider them the best and most roomy sheds which can be built for the same expense, and with the same amount of lumber, I will try and describe the make of them. Here goes for the plan and description.

Set the stones described above along the lines of your shed, twelve feet apart; on them place sills six inches square; toe four by four seven feet posts to the sills, over the foundation stones; spike a two by four on the top of the seven feet posts. From five to seven feet in from your foundation stones, set other stones parallel with them, and twelve feet apart also. At the ends of the shed set six by six posts on these stones, and let these posts be so high as is the pitch of the roof at the place where they strike. Through the inside of the shed use four by four for these posts set on the inside line of stones. You want six by six at the ends, to hang your doors on. Spike two by six from these inner posts to the posts in the wall of the frame at the top. Spike a two by six, either twelve feet long or fourteen feet long (depending on which width you prefer down through the center of the shed lengthwise, for a driveway), from the tops of these inner posts, thus tying these inner posts together, and, together with the pieces fastened from the inner posts to the posts in the wall of the shed, tying the building together in bents of twelve feet each. To the top of these inner posts spike a two by six, running lengthwise of your building, for a support for your roof. If you make a board roof, you will have to set up in the middle of each of the two by sixes, which are spiked across from the tops of the inner posts, short two by fours, to the top of which a two by four is spiked the whole length of the frame, for a ridge pole.

If you put on a shingle roof, you will have to use two by four rafters, sixteen feet long, and laid about two feet apart. Nail common lumber on, up and down, for sides, and don't batten the cracks ,but fit up your boards as tight as you can when you nail them. The cracks help ventilate the shed. In putting up the frame nail on braces wherever necessary.

Make doors seven feet high—the hight of your side wall—good, strong, double doors; the two, of course, being just as wide as the central space through the center of your building lengthwise, between the rows of inner posts. Frame a two by four to go across from the two hanging posts to slip in and out, to fasten doors to. Fasten doors so that one of them can be opened from either side of the shed. Have doors at both ends of your shed. Close the ends above the doors. Cut holes for windows, every twelve feet or less, two and a half feet long by sixteen inches wide, with covers to slide back.

Fit on a board about a foot wide, sloping a little out from the inside edge of the sills of the building, and you have a trough in which to feed corn in the ear, or shelled corn, and shelled oats. About two feet above the trough, and projecting out from the wall of the building about the same distance, fasten a board ten or twelve inches wide, sloping in with the same slant of the trough, and leaving about an eight-inch space between the two boards, and you have a rack and trough combined, which take up but little of your shed-room.

In the dark corners of your shed fit up some of those small pens which I described previously, for ewes refractory in owning lambs. Make a little rack and trough combined, to put in each of them, so you wont have to put feed right under their feet. Have some of those panels described, and instead of the bases, which take up too much room, have hooks fastened near the ends of them, and staples on the inside posts, so you can divide your shed into compartments to suit your convenience in lambing time, when bucking, altering lambs, sorting, branding, doctoring, cutting off long hoofs, etc. Overhead you can fix to put up some feed for ewes kept in jail.

It is best, at least in Northern Missouri, to let the boards extend down to the ground. The leaving a space of four inches in width below the sills of one of my sheds cost me, on New Year's day, 1864, about one thousand dollars.

GENERAL WINTER FEEDING.

When winter has fairly set in, one of the first things to attend to is the division of the flock. It is an axiom in sheep husbandry that the fewer sheep kept together the better they will do. In the West, however, the scarcity of inside fencing compels men with large flocks to feed more in one feed lot than they could wish. In quite large flocks, with but three or four separate lots, the most usual division is into breeding ewes, lambs, and the "dry flock;" the latter consisting of wethers—and, with men who do not breed such, yearling ewes, and such ewes as are thrown out of breeding for any cause. In this matter of division of flocks there is one rule which has no exception, viz: lambs *must* be wintered by themselves. Where one can, and has many of them, he ought to feed yearlings by themselves. They are nearly as hard to winter as lambs. It is better to put yearlings in with breeding-ewes (in case no bucks run with them—as they ought not) rather than with the wethers, as is usually done. The main thing in dividing up the flock is to get those of like strength and condition together as near as possible. Strong sheep running with weak ones crowd and push the latter away from their feed. Even if feed is thrown on the ground, more than sufficient for all, still the weaker ones have to take it after is has been run over. In case one is so well supplied with fields that he can subdivide the classes spoken of—as, for instance, can put his breeding-ewes in two feed lots, the way to divide them is to pick out the stronger sheep and feed in one, and the weaker ones in another, lot. So with the other main divisions, if one has many different fields. Feed lots ought not to be too small; five hundred sheep in a lot, of from five to ten acres at least, of good rolling ground. It may be stated that, in general, lambs should have the best chance—the best and greatest variety of feed, shed-room, etc.—the breeding ewes next, the yearlings next, and lastly, the wethers, which can "rough it," the best of any part of the flock. In the lamb feed lot the racks should be kept filled with the best and brightest hay. Give them a change once in a while; a feed of sheaf or oats or Hungarian, alternating with straw and shock corn. Don't compel them to eat their hay, etc., too close, but clean out the coarser portions from the bottom of the racks and feed to the wethers.

The manner of feeding, and the variety of feed possible, will depend on each individual's circumstances. In much of the State, shock corn will be the principal and most profitable feed. Where one has no tame meadows, he may, perhaps, cut and put up a good lot of prairie hay. Prairie hay cut green—and a month or more earlier than many people cut it—makes a good sheep hay. Straw ricked up right from the threshing machine pays well. Sheep will relish an occasional feed of it even better than good hay. I used to thresh my wheat and rick the straw up in the feed lots for sheep to run to; but for a few years past I find it more suitable to rick it elsewhere and to feed it in racks. It is enough better and goes enough further to more than pay for the labor of hauling it. When I wish to salt my sheep, and there is snow on the ground, I frequently fill the racks with straw and sprinkle it with brine.

A good big feed of hay and a feed of shock corn a day I think better for sheep than two feeds of shock corn—particularly if the corn is heavy. Any man engaged in sheep keeping ought to get into tame grass pastures and meadows just as soon as possible. I have large pastures on my present farm, made out in the prairie, which were seeded when but one and two grain crops had been raised on the land. I needed the tame grass too badly to till ground for five or six years to get "the wild nature killed out." I find that if the first breaking rots well, and I sow *lots of grass seed on an acre*, "the wild nature" does not trouble me much. I have one 160-acre pasture, the most of which was broke in June (raw prairie), put in wheat in September, and the next summer after the stubble plowed under and sowed to timothy (with no other crop), and to clover the following

March, which is a first-rate stand of grass and almost entirely free from resin weeds even.

I prefer feeding the most of my oats in the sheaf to threshing them; but I want them cut quite green, but not so green that they will not dry out under the band. When the ground is frozen hard and covered with snow it is better to feed sheaf oats or hay on the ground than in racks. Shock corn has to be fed on the ground; but by having large feed lots in a light sod blue grass, one can usually pick a fresh spot, in a wet time, so that they can eat tolerably well. If I think they are wasting too much fodder, I sometimes feed ear corn in troughs and hay in racks for a few days. A sheep will eat an ear of corn, which has not been shucked, in the mud, and waste but few kernels. It strips up a bit of the shuck on the upper side of the ear, to get a start, and as fast as it shells the kernels off into the shuck picks them up. Nothing, however, pulls sheep down any faster than having to feed or wade much in mud.

Sheep must not only have plenty of water when on dry feed, but must also have it convenient. Driving them off once a day to water will not answer the purpose, except they are left at the water for an hour or two. Wells and cisterns are preferable to ponds and creeks of little current, where it is necessary to cut ice and to which it is frequently difficult to get sheep to go down, if it is much icy around the edges of the holes. I covet very much some of those splendid springs in Southwest Missouri which run off two or hundred yards or more in the coldest weather without freezing over.

Sheep must be fed regularly, at just such hours each day. There are but few men who know what a difference this makes with stock—at least act as if they did. Twice a day is sufficient if one feeds regularly and *enough of it.* I am an advocate of strong feeding. That "sheep don't eat anything" is all a mistake. Whether corn is high or low it will usually pay best to give sheep all they can eat.

Feed according to the weather. Although sheep may be on a "top feed" and free from danger of foundering, still they will not eat, and should not be fed over half, frequently not half, in mild, sloppy weather that they will in severely cold weather. If fed too much shock corn on the ground in mild, warm days, they do not like to eat it even when the weather gets colder, because it has been run over. They cannot waste hay in racks, even should more be fed than they can eat in a day.

I have been feeding Hungarian hay this winter for the first time. I cut it tolerably green, before the seed was ripe. I have been somewhat cautious in feeding it, as it was new to me; have given a feed of it to my lambs about once in two or three days, alternating it with sheaf oats. As thus fed I have seen no bad effects from it so far, and must say that I never saw sheep pitch into any kind of feed more eagerly. When the season is right a man can grow a greater amount of it with the same labor and expense than of any other feed. On account of its tendency to stay in the ground always I have not only cut it green, but sowed it, also, on a piece of ground which I propose to sow in March with timothy, clover, redtop, and orchard grass for a permanent pasture.

If one gathers any corn off the stalk it pays well to get it out early for the pasturage of the stalks. But few persons have an idea of the value of stalk fields for sheep feed. One benefit is that, like grazing, the sheep all have an equal chance, and are not crowding each other about as when fed shock corn. In a field that will make fifty bushels to the acre, there will be left in it, with careful gathering, at least a bushel of corn; with careless gathering, frequently five or six bushels. I know not how it may be in Missouri, but I notice that the Suckers will not shuck nubbies, if corn is ever so high. Sheep will find every kernel of corn there is in the field. Let any one who thinks he gathered his field very clean go through it after a flock of sheep has pastured it, and he will be surprised at the number of the cobs left on the ground; after the blades and shuck are eat up the cobs show plainly where the ears were left. I am pasturing, this winter, one flock of one thousand head on stalk fields which I am buying at from thirty to fifty cents per acre. These are fields where a number of men are inclosed in one ring fence with no cross fencing and so cannot turn stock in. I aim to buy such fields as are free from burs, and such as were gathered most carelessly. My flock is now on a field which was hired to be gathered at so much per bushel; merely riding across I think I could have counted nearly one hundred ears. Although corn is selling now at sixty-five cents per bushel, I don't think mine (bought in stalk fields) has cost me twenty cents per bushel, saying nothing about the fodder, which is worth, per acre, the whole cost.

Stock fields should not be pastured too close; and toward the last of the pasturing it may be necessary to give a feed of ear corn once a day. They must not be pastured when muddy; if one's own field, for the good of the land and the sheep; if some other man's field, for the good of the sheep.

During the course of the winter it is a good plan—and saves sheep—to look over the different flocks about once in two weeks, and pick out a few from each which are not doing well and put them by themselves where they can have a good chance. When any die, in the winter, skin them as soon as found, fold the pelt up, with the wool outside, with a handful of salt inside. In about a week or two open it and spread it out, open the full size on the floor of a loft in the barn, and as they accumulate pile one on the other, after lying in the salt as directed. This treatment leaves the pelts full size, and they will sell for much more than when skinned and not salted, as they shrink into not more than half size. Except in cold weather, always pull the wool from the dead ones. In the winter they are usually frozen when found, so it cannot be done. Some shear their pelts in the spring, as the wool will bring, for some reason, much more than buyers will give for the pelt.

DISEASES OF SHEEP—DOCTORING—SCAB—FOOT ROT, ETC.

Although there is a long list of diseases treated of in the books, particularly in English authors, yet for all practical purposes the list of diseases affecting our American merino sheep is but a meagre one. In general wool growers do but little doctoring; having learned that if a sheep is quite sick it is almost sure to die, and the more they doctor the sooner it will die. There are men who practice indiscriminate dosing of sick sheep; giving one or more of those medicines most commonly found in farmers' barns—such as copperas, saltpeter, blue vitriol, etc. The same class of men give various nostrums—as sulphur, brimstone, etc.—as preventives, to well sheep, and are always doctoring for "grub in the head," with which complaint sheep sick with the most contradictory symptoms are charged.

In my own experience—although having exceptional cases—I have found that about the only complaints which are frequent, and which I can treat with any satisfaction, are diarrhea, costiveness, scab, and foot rot. One year ago this winter I lost quite a number of lambs with a disease which is either new in the country, or which has only lately begun to be noticed and described, and which has received the name of "pales" or "white-skin" in different sections. It appeared to extend through the northern wool-growing States pretty generally, and attacked mostly lambs during the winter and spring following their weaning. It was also preceded by a wet summer, occasioning a flush feed of grass. I am inclined to believe such one of the principal causes of it; for, this winter, I see nothing of it among my lambs, which are as healthy and hearty as any I ever raised, and yet have had no better nor other treatment than my lambs received one year ago. In some of its post-mortem appearances the disease in question much resembles Youatt's description of liver rot; particularly in the disorganized state of their livers. On opening lambs having died of it I found that at a touch of the finger the liver would crumble. The pre-mortem appearances are a general dwindling, from no apparent cause, but the most noticeable thing is the very whiteness of their skins. The skins of sheep sick from any cause lose their healthy red, but usually have more of a yellowish cast than those affected with this disease, whatever it may be.

Constipation—"stretches"—is most common when sheep are on dry feed in the winter. A sheep will be noticed away by itself, perhaps uneasy, and occasionally *stretching* itself. The best plan to give it relief is by an injection with a small syringe of warmish water—can be relieved, also, by doses of oil or lard. Foundered sheep, if taken in time—when in the bloated stage—can nearly always be saved by injections. The same is the best treatment, too, for young lambs which have been constipated by feeding scalded milk or cow's milk. In feeding young lambs cow's milk, if the cow is not tolerably fresh, put a little cane molasses in it.

Common diarrhea, or "scours," is most frequently caused by changing from dry feed to green. Sheep must be worked on to grass gradually in the spring; although by turning a flock out to herd as soon as the prairie fairly shows a little green they scarcely get enough, for a while, to scour many of them. A little prepared chalk is the best thing to give young lambs that scour; old sheep usually get over it without anything. I sometimes have a few bucks get to scouring badly in the latter part of summer, caused by eating something which does not agree with them, when I put them into a stock-yard for a day or two, which will usually stop it. It is not usual to doctor old sheep for scours unless it runs some time and the discharges seem to get thinner and thinner, in which case put them on dry feed for a short time.

The most formidable diseases to which sheep are subject are the two contagious diseases of scab and foot-rot. They cannot be too greatly dreaded nor too carefully guarded against. Either is bad enough, but of the two I think foot-rot the worst, merely from the fact that scab can be treated with less labor and expense, and does not require such vigilant and careful attention while doctoring it. Still, let a man have either in his flock and he will have about the same feeling as the man who told the traveler at the fork of the road that "although both roads led to his destination, yet if he took either he would wish he had taken the other!"

The scab is caused by a small insect burrowing in the skin and hatching others to continue the same process. It is analogous to the itch in the human family. It spreads from sheep to sheep by actual contact or from using the same rubbing places. It occasions an intolerable itching, and the victims try to relieve themselves by rubbing against fences and posts, and by biting and pulling at their wool. They will be seen, also, to scratch themselves much with their hind feet. One of the first appearances will be wet and dirty spots where they have bitten and rubbed themselves. In a short time the wool will be found bitten off in spots and will look ragged. In time, if not attended to, it takes the wool all off. Scabby sheep do not lose condition as badly as foot-rotted sheep. I am not aware that scab would kill them if not doctored; while foot-rot, if not treated, kills sheep frequently, by inducing maggots. It is (as *I* believe foot-rot to be also) strictly a contagious disease.

When it is caught in the fall, a dipping in a strong solution of tobacco as late as possible previous to the setting in of cold weather will frequently cure it and rid the farm of it. Like foot-rot (but "a little more so"), it is easy enough cured; the trouble is *to make it stay cured*—in other words, to clean out the contagious matter. A sheep cured of it will take it again as readily as one which has never had it if it is again exposed. Nothing but the cold weather of winter will clear it from a farm or range. In this respect foot-root has the advantage; as two or three heavy rains wlll clear a pasture from the contagion of foot-rot.

When a flock is first discovered to have it in the winter—i. e., when it first starts—it may be kept from spreading much by treating the diseased spots with a mixture of one pound of mercurial ointment and three pounds of lard, well stirred together, shedding them a few days. A strong tobacco " tea," poured over the affected parts, is full as good a remedy, and safer. But whichever is used the only intention is to keep it under until after shearing, when the entire flock (not letting the first sheep escape) must be dipped in a strong solution of tobacco water, and then transferred to a fresh range. One scabby sheep will, in time, infect a thousand head.

To rig up for dipping large flocks of sheep, hang two or three large kettles, in which to steep the tobacco, near the catching pen. Make a tank water tight, five feet long, three deep, and two wide. Set it in the ground to within a foot of the top. From one side of it, resting on an edge, let an inclined platform of tongue and grooved flooring extend, gradually rising a little toward the back end. Make a board fence to inclose the platform to hold the sheep while standing on it to drip. Cut a groove around the lower edge of it to conduct the tobacco water back into the tank. Have one or two hands catch sheep and hand to two others, who stand each at an end of the tank and plunge them —" head and ears"—back downward, all under the liquid; then set them out on the platform to drip. Keep the tea as hot as can be borne with the hand, and pour in fresh from the kettles as it becomes wasted. Keep up the strength by adding fresh tobacco stems from time to time. Dip immediately after shearing, and move to a fresh range, and also once or twice more in the course of the season—the last time late in the fall. One good, thorough dipping frequently cures a flock; the trouble is to keep away from the contagion afterward.

Foot-rot is the most to be dreaded of all the diseases to which sheep are subject. To those who may never have seen it, I will say that it is an ulceration of the feet, causing lameness, and, if neglected, frequently the death of the sheep attacked by it. It usually commences in one of the fore feet, but soon spreads to one or more of the remaining feet. A sheep will be seen slightly lame in one foot; on catching and examining it the inside of the cleft will be seen to have a slight greasy look, instead of smooth and dry, as sound feet are. As the disease progresses an ulcerous matter extends into the foot, either from the bottom or from the inside of one claw, seeming frequently, when uncovered with the knife, to run in seams. If neglected, the feet become fairly rotten, and almost from the first stages emit a peculiarly fetid stench. In hot weather, in the worst stage, the flies blow the feet and also spots on the sheep's sides, which become daubed with the matter from their feet, when they lie down on them, and soon the maggots make a finish of them. When a sheep is lame in both fore feet it gets down on its knees to feed. The disease spreads fastest in wet and warm weather. The infection is left on the ground, and a sound sheep, by stepping on it, catches it. In the winter, when the ground is frozen hard, the lameness stops a good deal.

In my opinion it is strictly a contagious disease. Some eastern men, however, think it sometimes breaks out spontaneously from pasturing wet ground. This notion originates, I think, in the fact that men sometimes get foot-rot into their flocks without knowing that they have been exposed. In many sections of our Eastern States where foot-rot has been known ever since the first importation of sheep, the country keeps stuck up with the infection; at least some man's flock and some man's farm has always got it; somewhat as in Germany, where the scab is so prevalent that even the rabbits catch it, and so, occasionally, inoculate a sound flock of sheep with it. Now, that foot-rot is wholly a contagious disease, like small pox, is evident from the fact that flocks have been kept in Illinois, and pastured on some as flat and wet lands as ever sheep were, for twenty-five years, and yet not have foot-rot.

When sheep were *driven* altogether (before railroads) from the Eastern States, foot-rot was scarcely known in the State. In fact, some of our pioneer flockmasters used to buy foot-rot sheep in Ohio and New York (knowing them to be such, but getting them cheap), and drive them out in the dust of summer, which would cure them. In such cases they used to carry a quart bottle of urine, with one-fourth of a pound of blue vitriol and two ounces copperas dissolved in it, with which to doctor the "limpers," which, always being behind, could be caught, trimmed with the knife, doctored, and put down again. One great reason why such drives cured the disease is because they were constantly going away from the infection. Constant traveling in the dust dries up the matter much, also.

There are a few main points to be borne constantly in mind in treating foot-rot. The first and most important being that the cure depends not so much on the kind of medicine (there are twenty caustics and combinations of medicines which will cure it) as on the thoroughness of the paring of the foot, and the completeness with which every particle of diseased matter is uncovered. It should be borne in mind that all caustics work mechanically, not medicinally, and, like a hot iron, sear only so much as they touch. If, then, in treating a flock of one thousand head, a spot of diseased matter no larger than a pin's head is left uncovered, consequently unseared, in one foot of but one sheep, the disease is not cured, but will commence again to run its usual course. However, the longer a flock has it the milder it becomes, and the slower it spreads. Any one can see how difficult it is to cure it in a large flock, even with the most vigilant care. On its first discovery in a flock, every sheep, *sound and unsound*, must be handled and treated. It is all-important, afterward, to separate the unsound from the sound. The flock must be put on a fresh range until two or three hard rains have washed off the infection. All cases, as soon as they show themselves, should be kept pared and doctored. The best caustic to use out on the range, or pasture, where sheep are to be treated and put down right there, it may be into wet grass is butyr of antimony. Put it in a bottle, and apply lightly with the feather-end of a quill. This is a severe caustic, and as instantaneous in its effects as touching with a hot iron—fairly making the flesh "smoke." Be careful and not get the stuff on your flesh or clothing. One caution is necessary with *thorough* men, and that is to not treat with medicine too often—once in two or three weeks is sufficient. This is one of the cases, almost, in which the remedy may be made worse than the disease.

I once bought a flock of about nine hundred sheep which had the foot-rot bad. They were in their second season with it. I bought them in the fall; had not been doctored the least for two months preceding, the owner having sickened of trying. I think fully half of them were lame, although none of the feet had got quite into the rottenest stage, and none of them were maggotty. I bought them at "foot-rot price," for a speculation, and did not bring them on my farm at all. As soon as purchased, I went to work and rigged up to give them "a going over." I made a catching-yard on a dry piece of bare, hard ground, and at one end of this yard a small one to fence off the operators from the flocks while at work. Close by were hung two large kettles in which to heat, *and keep hot*, a solution of blue vitriol. On the opposite side of the "operating room," from the catching pen, I set a trough, twelve feet long, ten or twelve inches wide, and six or eight deep, so that one end of it just came into the operating pen. Two panels were put tight against the sides of the trough, fencing it just its width. Two boards were rigged to close the two ends of this alley as doors. As near as I remember, I think I bought about nine or ten pounds of vitriol to the hundred head. Getting together six or seven faithful hands, armed with thin, half-worn, sharp shoe-knives, and having toe-shears and whetstones handy, we set to work. First, a lot of the solution was got hot in the kettles, and enough poured in the trough to fill it about three inches deep. One hand caught and handed to the extempore surgeons, who were seated on bundles of straw on the ground. If the hoofs were quite long, they were trimmed with the toe-shears. Then each foot of every sheep was examined by paring a little with a knive to make sure. The diseased feet were pared carefully down to the very bottom of the matter, if it took the whole hoof. When a hand had finished paring a sheep he placed him in the trough, in which he was compelled to stand by the panels. When the trough was once filled with sheep—all headed one way in single file—the gate at the further end was opened and *but one*, the further one, allowed to pass out. Afterward, when one sheep was put in at one end, one was turned out at the other end; thus each sheep stood in the hot solution from five to ten minutes. At the end of exit we put air-slacked lime, three or four inches deep, for them to step in. As blue vitriol is rather a mild caustic, passing through lime with wet feet made it dry in quicker. The flock, after being treated thus, was put in a yard free from grass, and having a dry, bare ground footing. In about three or four weeks' time—takes nearly that time for them to recover from the effects of the scorching—there were only about a dozen lame sheep. This is not a large number, but enough to show that it is not as yet cured. Then we went at them with butyr of antimony, and by virtue of changing range two or three times, doctoring a good deal, and being favored with a dry summer, scotched the snake, not killed it! I will add, however, that in the fall there were but three or four lame sheep, and that I cured the disease by trading the flock for a grocery.

FLAX AND HEMP.

BY S. A. CLEMENS.

In the wise desire among western farmers for a greater diversity of staple crops, increasing attention and inquiry is directed to flax and hemp culture. The present purpose is to briefly review the development of those interests at the West, consider their present condition and prospects, and to give facts and suggestions derived from the local experience in the management of these crops. This will best serve for the guidance of farmers who, as new settlers in this section or otherwise, may need information on the general subject. It is evident that systems of flax and hemp culture, and treatments suited to Europe or the Eastern States, where farm labor is abundant, may not be profitable in the West, where labor is scarce and land comparatively cheap. Here the flax or hemp grower must send his crop to market with the least expenditure of labor consistent with fair returns as to quality and quantity of the product. Hence, under the head of directions for these crops, it is deemed sufficient in these pages to give the approved results of experience in flax and hemp culture in our own section. The modes of culture and the various processes of preparation of these staples practiced in other countries, under different conditions of the labor, land, and market relations, may be found elsewhere in more extended treatises upon those subjects.

Flax and hemp are associated in the popular thought from the similarity of their useful fibers. For this reason, perhaps, they are often confounded by the inexperienced, and by the takers or compilers of the last United States census. To such a degree is the one mistaken for the other, that the statistical tables of these products, for some of the States, are incorrect, and hence the aggregate amounts for the whole country are quite unreliable. Yet, beyond the mutual resemblance of their fibers, and a similarity in the modes of their preparation for use, these two plants, and their necessary treatment, differ so greatly as to indispensably demand for each a separate consideration. Preliminary to this, it will be of interest to examine both the earlier and the more recent progress of flax and hemp culture in the Western States, and the prospective demand for the products in connection with home manufacturers; also, to consider the possible improvements in the preparation of hemp fiber, whereby it can be more cheaply produced, and in a condition adapted to new uses and a greatly increased consumption.

In the early settlement of the West, as at the East, flax was cultivated on almost every farm, in small patches, for use in domestic manufacture. Subsequently, for many years, its culture for the seed only was quite extensive in some of the Western States, especially in Ohio. During this period, commencing about one generation ago, the preparation of flax lint for domestic manufacture was gradually discontinued. Later in that time, flax mills were erected at a few places in Ohio and Indiana for preparing flax tow by machinery from loose or tangled flax straw. This product of the flax crop, when grown and cut for the seed alone, had previously been of no available value, and was burned or otherwise wasted on the farms. The flax tow made in these flax mills was sent to linen factories at the East, where it was used as material for coarse fabrics. When power machinery began to be used for the manufacture of bale rope, some of this flax tow found its way into the rope factories, to be mixed with hemp tow.

The annual production of flax seed in this country, by the census returns of 1860, was 611,927 bushels. This reported amount is believed to be less than the average yearly crop in the previous decade, as but a few years before, in one season, it was known that nearly 300,000 bushels of flax seed were collected for oil making at one inland point in Ohio. Since 1860 the high prices paid for flax seed have induced a large increase of this crop in Ohio and its general extension in other Western States. At the same time the demand for flax tow to supply material for eastern factories, where, during the war, it began to be largely used for grain bags, led to a large increase in the number of flax tow mills in the West. In Ohio, Indiana, Michigan, Illinois, Wisconsin, and Iowa, there are now about ninety of these mills, of which fully one-half are in Ohio. Their aggregate capacity of productions may be estimated at about eight thousand tons of flax tow yearly. But, as they are for the most part in operation only a few months in the year, in the absence of accurate statistics it may be doubted whether they all have ever made more than two thousand five hundred tons in a single year.

Meanwhile, in the States named, several small factories have been erected for making flax tow into grain bags, bagging for cotton bales, crash, bale rope, and twine. There also has been a demand for interior flax tow, to be used as material for paper. Since the war, importations of jute from India, for the use of eastern manufacturers of grain bags, burlaps, twines, etc., have driven western flax tow from that market. This foreign competition would have been fatal to the western flax lint business but for the sale of tow to supply the small factories at home, and to afford material for mixing with hemp in the rope and bagging factories of Louisville and St. Louis.

The cultivation of flax for the seed only, or mainly, has been so greatly extended in the Western States during the recent period spoken of that the yearly product of flax seed is believed now to amount to not less than two million five hundred thousand bushels. Estimating an average of twenty-five pounds of fiber to be grown on the flax straw which produces one bushel of flax seed, the West has given 62,500,000 pounds of flax fiber the last year. Of this vast amount of valuable material, it is probable that less than 1500 tons, or 3,000,000 pounds, will have been saved and prepared for use. The remainder, amounting to 58,500,000 pounds, or 20,250 tons, has been burned in the straw, or otherwise gone to waste on the farms where it was grown.

Had these flax crops been grown with reference to the production of a good yield of lint as well as of seed, the product of the latter would have been increased to the acre, and the proportion of fiber to each bushel of seed would be larger than the above estimate.

The cost of the flax tow machines used in Western flax mills ranges from $500 to $2500 in each, aside from the motive power, which is usually a steam engine run by the shives, or woody fragments of flax stalks used for fuel. The daily capacity of these different kinds of tow machines varies from 400 pounds to two and one-half tons of tow. Some machines require from three to four successive handlings, through two different machines, to make clean tow; while others attain this result at one operation of a single handling of the material. The tow machines of largest capacity, which makes clean tow at one operation from tangled flax straw, is provided with an automatic feed-straightening and equalizing attachments, by which the working capability of any flax breaking and cleaning apparatus is greatly increased.

For the preparation of flax tow for spinning purposes it is necessary that the flax straw be rotted, there being no reliable demand for unrotted flax fiber, save in the half-cleaned state for the use of upholsterers. The recent large increase in flax culture does not yet make us independent of foreign countries for supplies of linseed and linseed oil, of which large quantities are still imported. This gives assurance of a further extention of this culture year by year, especially if sale can also be secured for the product of flax straw as well as the seed. It is already a favorite crop in many localities in the West, where spring wheat is uncertain, and flax growing, as a preparatory crop for fall wheat in place of a summer fallow, is proved, by years of extensive practice in Ohio and Indiana, to be beneficial to the following wheat crop. The management of this crop for the production of scutched flax, or long line, as it is called, requiring the growth of long fine lint, is quite another branch of flax culture. For this purpose it is necessary that the flax stalks be kept straight in bundles, and, with some modern improvements added, it is the old mode of handling and preparing flax, when it was used in domestic manufacture. Flax prepared in this way for the general market has been produced to a limited extent in most of the Western States. Where the quality and condition of the soil are favorable, and the careful management of the crop can be induced, a growth of long, fine lint flax may be expected, and, with the proper facilities of machinery, its production can be made quite profitable. The insufficient supplies of fine scutched flax of home growth, for the manufacture of linen sewing thread, shoe thread, and fine woolen goods, necessitates large annual importations of the foreign article.

The production of the best qualities of lints does not here require the sacrifice of the seed, by harvesting the crop before the flax seed matures, as many suppose, because it was formerly the practice in Ireland.

Passing to the general consideration of hemp culture in this country, we learn that at an early day this crop was grown to some extent in all the old States from Virginia northward. Subsequently, as the first steps in the transfer of this culture exclusively to the west, hemp was grown on the rich alluvial bottoms of the Ohio river, in Western Virginia. More extensively on the fertile cane lands of the since called blue grass region in Kentucky, hemp for many years became the leading farm staple. Twenty years ago, the annual hemp crop of that State amounted to about sixteen thousand tons. This was nearly all used in the cities of that State, and in Cincinnati, by the numerous factories for making rope and bagging, to bale the Southern cotton crop.

About twenty-five years ago hemp culture began to receive extensive attention in Missouri, contemporaneously with the establishment of bale rope and bagging factories in St. Louis, followed by others, at different points in the State. Hemp now speedily became a leading crop in the river counties west of the center of the State, and also on the Missouri river bottoms to its mouth, and to a less extent in the northeast part of the State. The congenial soils and climate of these localities for the growth of superior hemp, and the comparative low price of land, led to a rapid transfer of this interest from Kentucky, when a decline in hemp culture ensued, somewhat proportionate to its increase in Missouri. During the period named emigrants from Kentucky to rolling prairie lands in Illinois and Iowa, made trial, at their new homes, of hemp culture occasionally, on a small scale; and, in many instances, better crops were realized to the acre than they had been accustomed to on their old farms. But, in those days of harvesting and preparing hemp by hand, exclusively, this came to be regarded as specially a crop for negro labor, and it never gained extensive pursuit in the original free States of the West.

The maximum hemp crop of Missouri was attained shortly previous to 1860, when it amounted to a yearly product of near ninety-two thousand bales, received at St. Louis, or about seventeen thousand tons. The last United States census reports nineteen thousand two hundred and sixty-eight tons of hemp for Missouri, probably computing by the legal ton of two thousand pounds, instead of two thousand two hundred and forty pounds to the ton, as is still the absurd custom of the trade. The same census gives the annual hemp product of Kentucky as thirty-nine thousand four hundred and fourteen tons, which is manifestly an error, possibly made in the compilation of the returns, by mistaking bales for tons.

The introduction of hemp culture from the east into the valley of the Ohio was followed by the abandonment of the old practice of harvesting this crop by hand-pulling, and the substitution of cutting it by the use of the hand hemp-hook, an implement similar to one form of the corn-cutter now in common use. Subsequent to the early days of hemp growing in Missouri, the use of the hemp-hook was superseded by that of the hemp-cradle, which is an enlarged form of the old grain-cradle, an attached scythe doing the cutting of the hemp near the roots. This eventually came into general use, save for cutting very tall, heavy hemp, for which the hemp-hook was still retained. During the later years of the great development of hemp production in this State, numerous attempts were made to invent and adapt portable power machinery, both to take the place of cutting hemp by manual labor, and also in substitution of the hand-brake which, coming down from remote times, was still in exclusive use for breaking and cleaning hemp. There resulted from these efforts toward labor-saving the adoption of a form of the common harvesting machine, with a special attachment for dropping the cut hemp in gavels behind the machine. This, with recent improvements in the dropping attachment, and its connection with the two-wheeled machines of more modern pattern, is now in general use for cutting hemp by horse-power, in place of the old hand-labor implements. In the still more tedious operation of breaking and cleaning hemp, there also have come into general use different kinds of portable machines, which, propelled by horse or steam-power, rapidly rough-break the hemp, and separate from the fiber the greater portion of the shaves, or woody fragments of the hemp stalks. The operation of these machines greatly aids and expedites the final manual process of cleaning the hemp by breaking and whipping it on the old hand-brake, which is still generally in use for this purpose. Still more recent improvements are ready for introduction, by which the fiber of hemp is prepared for manufacturing at one operation of horse-power machinery.

The adoption of the popular labor-saving machines above named has greatly facilitated the farm handling of hemp, and opened the way generally for it to have a place among the routine of farm crops which are suited to the genius of free labor. The more recent and perfected mechanical agencies now at command, and the better system which their adoption involves, it is believed will fully emancipate hemp culture from the heaviest burden of necessary labor which still rests upon it.

While the hemp product of Russia, Hungary, and Italy is all water-rotted, as is also the flax of these and other countries of Europe, the hemp of our western States has been almost exclusively dew-rotted. Hemp of the latter kind, though quite suitable for common, coarse, textile fabrics and cordage, yet is not as durable in water, and will not retain tar like the other. It therefore is not used in the manufacture of tarred cordage, fish lines, and fish nets, for which purposes we import water-rotted hemp, to the annual average of about three thousand tons.

For many years, previous to 1860, under a law of Congress designed to secure the use of American water-rotted hemp in the navy yards of the government, agencies of the navy department were located in St. Louis and Lexington, Ky., for the inspection and purchase of domestic hemp of this kind. The standard government price was two hundred and eighty dollars a ton, paid in gold, at the agency, as soon as the hemp was inspected—often an inferior article being accepted without question. This was when good dew-rotted hemp often sold at one hundred and twenty dollars a ton, in St. Louis, and Russian hemp at two hundred dollars a ton, in Boston.

Yet this extraordinary protection by government failed to establish, to any considerable extent, the practice of water rotting among western hemp growers. Barely one hundred tons a year of this article were produced, ten years ago, in Kentucky, and in some years none was sent to the St. Louis agency from Missouri. The processes of preparing hemp by this mode were regarded as too laborious, disagreeable, and unhealthy, even where water for the necessary rotting pools was convenient to the hemp fields. It was found to be impracticable to clean the water-rotted hemp on the hand-brake, unless the strength of the fiber had been injured by overrotting. Otherwise, it was necessary to scutch the hemp on a revolving wheel, after hand-breaking it, which made increased labor and much waste of tow. In Russia the hemp is said to be hand-scutched. Doubtless the soft quality and the solvent properties of the waters of the Missouri river may be used in water-rotting hemp grown upon its fertile banks, and result in the production of a quality of fiber equal to the valuable white Italian hemp, which is rotted in running water, by placing it in large crates, made to float in the river Po and other streams, the sources of which are the soft waters of melted Alpine snows.

For some years, down to 1855, an establishment for steep-rotting and preparing hemp, equal to the best Russian article, was in successful operation near Springfield, Illinois. Use was there made of Schruck's process for water-rotting flax or hemp. This is an American invention, which, for many years, has been extensively adopted in Ireland and other parts of Europe for flax, and also, to some extent in this country, for both flax and hemp. By this process, the material to be rotted is placed in large vats, which are then filled with water, which is, by steam pipes, gradually heated to the temperature of 95 degrees, to hasten the fermentation.

Hemp mills using this method were formerly operated near Lexington and Louisville, in Kentucky, and one, nearly completed, was burned at Glasgow, Missouri. A like concern has been conducted at Galesburg, Illinois, for several years past, using the hemp crop of several hundred acres annually raised in that vicinity. There are also a few establishments in Illinois and elsewhere in the West for steep-rotting both straight and tangled flax straw.

During the history of flax and hemp culture for the last half century, and especially during the last eighteen years, here, as well as in Europe, numerous persevering attempts have been made to shorten the staple, or, as it has been called, to cottonize these fibers. The object of this has been to adapt these long fibers to be worked on cotton or wool-spinning machinery, either alone or mixed with cotton or wool. The high prices of cotton, during the late war, afforded a powerful stimulus to those experimental efforts. The resources of mechanical invention and chemical skill were enlisted, in all conceivable ways, to make flax and hemp into cotton, or its manufacturing substitute. But all the various plans for this end are now abandoned, save in unimportant instances. Indeed, none were successful in the attainment of the main object. All are now convinced that the natural and unalterable characteristics and differences of these fibers will forever require that flax and hemp be worked and spun upon special machinery different from that which is now used for cotton.

It is, perhaps, worthy of note that among other devices for making artificial cotton out of flax and hemp, the one of most startling originality was the exploding of those substances from a steam gun. As the result of this warlike expedient, the flax or hemp burst into an infinity of ultimate fibers, of almost microscopic fineness. But this was something different from cotton. In fact, the bold metamorphosists now forgot all about cotton. They had found a new fibril which only required the invention of machinery sufficiently fine and delicate to work it, and they could produce fabrics outrivaling the gossamer products of the looms of Cathay.

As before noticed, the great development of hemp production in Kentucky and Missouri was called out to supply material for the manufacture of rope and bagging for cotton baling. In the early days of this branch of manufacture, bale rope was exclusively spun by hand, and this, with the yarns for coarse bagging, were both made of long hemp fiber. By subsequent improvements in manufacturing machinery yarns for rope and bagging were more chiefly spun from the tow of hemp. To supply tow for these uses large quantities of hemp were dressed, both on the hand and on machine hackles. The dressed hemp was chiefly sent to the eastern market for hand spinning, while the hackle tow was retained for use in the local rope and bagging factories. As the best hemp is required for hackling, much of the article of common quality has been converted into tow by suitable machinery in the factories, and there carded and spun in the same way as hackle tow. The dressed hemp, from which the tow has been taken by the hackle, is now almost exclusively spun by hand, in small rope walks, in all the cities of the land, east and west. No inconsiderable portion of the whole supply is there made into slack-twisted coarse yarn, for use as steam packing on all classes of steam engines. The largest portion is made, in the same way, into a great variety of twines and small cordage, of the kinds which are required for superior strength and durability. For these qualities, hemp has the preference over flax, and much more over jute, both of which, first prepared as tow, are made into twine and other cordage, on tow manufacturing machinery.

The foregoing represents the last phase of hemp manufacture in this country, and the general uses to which the hemp crop of the West is now appropriated.

It is of interest to note the recent tendency, both in this country and in Europe, to adopt systems of tow working machinery, for the manufacture of most of the long vegetable fibers. Even yarns for fine linens, as well as the coarsest hempen fabrics, are now made of tow, of the qualities suited to each. The reason of this is found in the comparative cheapness of this class of machinery, its greater durability, and because it can run faster and do more work with the attendance of fewer workmen than long line working machines of similar capacity. Late improvements seem to be in this direction to a remarkable degree, and, by taking note of it, the producer of hemp as well as of flax will find profit in preparing his material to suit the machinery of the manufacturer, in the primary process of getting it ready for market.

For the manufacture of both rope and bagging, hackle tow ordinarily sells at fully equal prices to the common run of undressed hemp, used for the same purpose. To keep the hemp straight, in breaking by the power machines, and in afterward cleaning it on the hand brake, requires extra labor. There is also extra labor in twisting up the cleaned hemp by handfuls, at the brake, and carefully doubling it on itself to form neat "heads" of hemp, and in tying up the heads in bundles, for transportation to the shipping warehouse for baling. In the latter operation extra labor is also required to place the heads of hemp, one by one in regular order, in the box of the baling press.

When the bales are opened on the floor of the distant factory, there is also extra labor in untwisting the heads of hemp,and in running them through the machinery by which the undressed hemp is converted into tow, to get the fiber into condition for manufacturing. Obviously all this extra labor and expense would be staid, by preparing the hemp in the form of clean tow on the farm, if machines were at command to do it. The production of hemp tow would be cheaper to the farmer than that of the undressed hemp, and it would be worth more to the manufacturer of bale rope and bagging.

Acting on this idea, steps are already taken for the introduction, into the principal hemp-growing districts, of well-proved portable machines of recent invention, which break the stalk hemp, and make the fiber into clean tow at one operation. These machines can be made to work hemp with extraordinary rapidity, and without any waste of useful fiber, which alone seems an important item compared with the common methods. The farmer, also, will be relieved from the trouble and expense of extra hired labor, hitherto found necessary to clean the hemp on the hand brake after it has been through the common rough breaking machines. It also opens the way for a better systemization of hemp production, by making a separate business of preparing hemp tow for the hemp growers, for which purpose these new machines are intended to be used in a way similar to the practice in wheat-growing districts where the owners of threshing machines take them from farm to farm and thresh out the crops of wheat.

In the days of home-made linen, hemp, for its greater durability, was often preferred to flax for this purpose. To prepare it for spinning into fine yarn on the hand wheel, the heads of clean hemp were thoroughly pounded by hand with a suitable modern implement, or subjected to a milling action under the ponderous revolving stone of a cider mill of the old circular trough construction. The object of this was to soften and separate the hemp fibers into finer filaments, which fitted them for further refinement on the flax hackle, after which the material could be spun into fine yarn upon a flax-spinning wheel. This illustration of the capabilities of common dew-rotted hemp for further preparation whereby it can be spun and woven by power machinery into finer kinds of fabrics than those for which it is now used, may well excite wonder that nothing hitherto has been done to this end on a commercial scale. Dressing hemp on the hackle is the only refining operation which this staple now receives before it is manufactured. The comparatively coarse, rigid fibers of the hackle tow, of varying length, from two feet to a few inches, can only be manufactured on coarse, strong machinery, and spun into coarse, rough yarns, like those seen in rope and bagging for cotton baling. The dressed hemp can be spun into finer and more valuable yarns than the tow taken from it by the hackle, but only by the hand labor of workmen, skilled by years of practice in the rope walks where hemp twine is manufactured. Nothing, save their greater strength and durability, which is indispensable for many uses, gives sale for these expensive hand-made hempen twines. They are surpassed in evenness and finish by machine-made twines of flax and jute tow, made at one-fourth the cost of manufacture for similar sizes. Yet the business of hand hackling hemp, extensive and profitable as it now is, derives almost its sole support from the demand for the dressed fiber, to be used in hand-spinning.

With the exemplification before given that hemp is susceptible of mechanical treatment, to subdivide, refine and ameliorate its fiber, it is a matter of no small moment that it be done by machinery, if possible, and hemp tow of such quality be sent from the primary points of production for the use of machine spinners. When this is done, not only will the hackling and hand spinning of hemp become obsolete, but the use of this fiber for cordage will be larglely increased, and it will be introduced to uses of far greater magnitude, for which flax, and more especially jute, are now employed. To attain this result, the first steps have already been taken, by the transfer to the hemp-growing region of Missouri of several of the flax-tow machines of largest capacity, in recent use in several other western States. These machines, slightly modified for their new use, have been proved to be well suited to make refined, even stapled tow, by reworking the rough broken hemp from the machines in common use on the hemp farms. They will also clean, refine, and even the staple of hackle tow and farm machine tow. They are intended to be used at the points where hemp is shipped to the city markets, and there be operated, by aid of steam power, in connection with warehouses for baling and storing hemp. Receiving the rough broken hemp or tow in bulk from the farm wagons, it can be rapidly run through one of these machines and converted into clean, even stapled tow without waste of fiber. The mechanical action of these machines, which most successfully works tangled flax straw, is also found, in reworking hemp, to be well suited to mill, and soften its fibers and produce hemp tow of a new and hitherto unequaled quality.

When this prepared fiber is produced in quantities sufficient to give confidence to manufacturers, its qualities promise to secure a great demand for its use, as material for grain bags, canvas, carpet yarns, twines, etc. In the production of these and similar fabrics, there is room conditionally for a larger consumption of suitably adapted hemp fiber than has ever been called for in connection with the home supply of stuffs for cotton baling.

The early establishment and enlargement in the West of the manufacture of all the varieties of fabrics above named is of such obvious importance to the farming interest and the general prosperity, that it merits all possible encouragement from the local influences and the governmental policy.

In considering the correlated interests of the production and manufacture of flax and hemp in this country, reference must be made to the competition which both farmer and manufacturer encounters from the importation of similar foreign products. Of all these, the jute fiber of India and its fabrics conflict most with our home interests.

The importations of water-rotted hemp from Russia and Italy, and of fine linens from Great Britain and the continent, to the annual value of about twenty-five millions of dollars, we may concede, until, by the development of our national industries, we get ready to supply ourselves in the production of these articles. But the home market for the coarser fabrics, made from home grown fibers, in justice should, without delay, be for the benefit of our own people. Until importations of jute and of jute fabrics are restrained by higher custom-house duties, the market here for such products will continue to be held mainly for the benefit of alien capitalists and heathen cultivators.

Jute is the common name of the similar fibers of two plants, of different species, which are produced in British India. Gunny cloth, so extensively imported for covering cotton bales, and gunny bags, in common use here as corn sacks, are made of jute, spun and woven by hand by the natives of India. The tensile strength of jute is less than one-half that of hemp and flax, with still less proportionate wearing durability, and it soon decays when exposed to dampness. Yet jute works kindly on manufacturing machinery, and makes even yarns, and smooth, plausible-looking goods. It can easily be prepared for working on the same machinery used in manufacturing flax tow, and for which the new article of refined hemp tow is also intended. Of late years jute fiber has come into vast use in Great Britain, in the manufacture of coarse bagging, burlaps, etc. In the Eastern States, also, jute has become an important material of manufacture, and of late it has effectually excluded western flax tow from that market, except for limited uses. The gunnies, grain bags, wool sacking and burlaps of all sorts made of it, are sold everywhere in the West, and often called linen by the sellers. The price of jute fiber at the eastern ports is usually about seven cents a pound, the duties being $15 a ton; and an inferior article, called jute buts, can be imported and sold at three cents a pound, or even less. The freight charges from Calcutta to Boston are less than from St. Louis to the same point. The importations of jute fiber, gunny cloth, and gunny bags into the United States in 1860 amounted in weight to 63,992,349 pounds, or nearly 32,000 tons of 2,000 pounds each. In 1865, by reports of the treasury department, the importations of jute, and of its manufactured products, had increased to 91,549,800 pounds—nearly 46,000 tons. This included 6,875,215 gunny bags, and 11,641,200 pounds, or near 5,820 tons of unmanufactured jute. Most of these products are consumed in the Western States, where flax and hemp would be far more generally produced, and their manufacture into a better quality of the needed fabrics would be established, but for the competition of this flimsy, disreputable fiber, which is grown where labor is paid less than ten cents a day.

That the farmers of the West can produce on demand, with short notice, additional supplies of hemp and flax to an amount more than equivalent to the competing materials now imported, admits of no question. It has been shown by a moderate estimate that 30,000 tons of flax fiber are now annually wasted in this country mainly for want of a reliable market. Such a market could be afforded by the erection and successful operation of flax mills and factories for manufacturing flax and hemp. This would now be done, but for the fear that such investments are unsafe, so long as foreign capitalists and importers have it in their power to flood the country with the competing products, imported for the purpose of breaking down the home business, and thus commanding the market at their own prices. In addition to flax, the product of which could be greatly increased, the hemp crop, which in Kentucky and Missouri once amounted to about 30,000 tons annually, and now fallen to near 7500 tons, with proper encouragement for its more extended culture in this and other neighboring States, would soon be restored to the former maximum. Tariff duties of two cents a pound on any form of the unmanufactured fibers of imported jute, hemp, and flax, with three cents a pound on jute buts, and four cents a pound on the coarse fabrics of these fibers, would effectually build up the western industries in question, and without injury, it is believed, to the national revenue.

The West has seldom called for governmental protection to its agricultural interests against the antagonism of foreign competition, but, in the case under consideration, the neglect to make that call is a failure to insist that the right hand shall be allowed to supply the wants of the left. With such an expression of the sovereign will as shall give their own home markets to western farmers and manufacturers, and the general adoption of the improvements now applicable to the culture and preparation of flax and hemp, these lint crops and their related manufactures would soon take front rank among the productive industries of the land. This would aid all collateral pursuits, increase the general prosperity, diminish our foreign dependence and yearly debt, and help us to pay our revenue taxes.

Passing now from the general topic of flax and hemp to the special subjects of their western culture and the preparation of their useful products, each will be considered in the order of their historical appropriation to the uses of mankind. In this flax takes the lead, for its culture and manufacture are as old as the pyramids.

FLAX LAND.

It is fortunate for the general diffusion of flax culture that no cultivated plant finds a wider congeniality of soils and climate. Both tropical Egypt and the arctic districts of Russia, as well as the intermediate regions, grow flax for their own use and the markets of the world. So in our own country, flax flourishes under generous culture from the gulf to the vally of the Red river of the north. Clay lands and sandy loams, uplands, and alluvial bottoms, timber lands and prairie, all bear good flax under favorable conditions.

The special conditions requisite of the soil are, that it be of good depth, in good heart, well drained by nature or art, in good tilth and free from weeds. The exceptions to this are, lands of deep sandy or gravelly subsoil in which the growth of flax, like that of any other crop, will suffer in a dry season, and in mucky or new lands which hold an excess of vegetable mold, and are deficient in silicious matter. In the latter case the flax, from too rank growth and deficient strength of stem, will be liable to fall and lodge before it matures. The subsoil for flax should neither be so loose as to allow the rain water to leak through too rapidly, nor so open as to retain it in saturation about the roots of the plants, or within two feet or more of the surface. The fine roots of flax tend to penetrate to a depth in the earth nearly equal to the length of the stalks of the plant, and therefore a good depth of soil, tillage, and of a kindly subsoil is especially desirable. Yet, notwithstanding the general rule, good flax is known to be produced in favorable seasons where the subsoil is stiff clay, not admitting of the deep penetration of the roots. With proper cultivation it may be expected to do well on good average soils for corn and wheat. On recently cleared timber lands it is found to yield a taller growth of stalks and heavier lint crop than on new prairie land. This is due, probably, to the shelter from winds afforded by any adjacent forest, and partly to the ashes of the burned timber, which serve as an excellent fertilizer for this crop. Flax does well after most tilled crops and on well-decayed meadows and clover swards. It is grown with pecular success after hemp, and in Europe hemp is said to be often cultivated with special reference to an after crop of fine flax. In no case should flax be put upon very weedy land, with the expectation of getting a paying crop. On land bearing such evidence of slovenly culture, the weeds "choke the good seed."

PREPARATION OF FLAX LAND.

Like all plants which are delicate in germination and early growth, the flax crop calls for a seed-bed of the finest tilth. To prepare for this, deep fall plowing is advisable, that the surface may become thoroughly disintegrated by the winter frosts. In the following spring, as soon as the land is suitably dry, it should be plowed with a shallow furrow, or it may be stirred with a field cultivator, working it both ways, if necessary, to thoroughly loosen the surface. If, from any cause, the land has become compacted to the depth of the fall plowing, the need of a deep plowing in the spring is indicated. But, if clover or grass sod has been turned under deeply the previous season, it is not best to go to the full depth of the old sod in the spring plowing. Should the land be cloddy after the plow or cultivator, a field-roller can be used to reduce the clods. In either case the land should next be harrowed, and, if the time is no earlier than the first of April, and the weather indicates an early spring, the harrow should pass over twice, to make a fine seed-bed, and the flax seed may be sown without delay. In some instances good flax crops have been grown on well turned, upland prairie sod, broken the previous year. This should be rolled, to even the surface previous to the harrowing. Replowing it in the spring is not advisable, unless the sod is thoroughly rotted, and the plow then should go deeper than the old sod, when an excellent crop may be expected, Without plowing in the spring, if the ensuing season is moderately wet, and otherwise favorable, a good flax crop will be produced,

Sometimes, also, good flax has been grown on fresh spring-broken prairie or meadow sod, deeply turned under with a common green sward plow, rolling and harrowing before sowing, as before advised. This culture, on raw land, also, does best in a wet season. As the crop of flax seed can usually be in readiness for market by the first of August, to the prairie settler, who begins breaking his new farm early in the spring, and may wish to get the earliest cash returns from his land, the last named mode of culture well merits attention. After flax he can follow with wheat, and thus virtually obtain two new sod crops. When manure is applied to land designed for flax, it is best to put it on with the preceding crop, or it may be plowed in the fall previous, if well rotted or composted. Fresh stable manure, put upon the ground directly before sowing flax in the spring, will injure the crop, both of lint and flaxseed. Leached wood ashes are an excellent stimulant to this crop, and may be sown liberally as a top dressing, either at the time of seeding for the crop, or soon after the flax has come up. Care should be taken that the old roots and stumps of corn, or the debris of any previous crop, do not remain on the surface of land prepared for sowing flaxseed.

STOCK FLAXSEED.

Experience with flax culture,'in all countries, has shown the importance of the careful selection and frequent change of flaxseed for sowing, to produce the best crops of lint and seed. For this use only clean seed should be allowed, as the smallest quantity of the seeds of wild rape, wild mustard, false flax, buckwheat vine, or fox-tail, when sown with the flax, will often do the farm more injury by introducing these nuisances than the value of the flax crop which they first accompany. The flaxseed for sowing should be uniformly plump, and of a bright, shining, copper color. In preserving the seed until time for sowing, care is requisite that it do not heat by being stored in too great bulks, lest its power of germination become impaired or lost. A safe way is to first dry it thoroughly, if newly threshed, by spreading it upon a floor, and then store it in bags, barrels, or small bins, in a rat-proof granary. Kept dry and cool, it may be preserved sound for years. The notion exists in some flax countries that old, sound flaxseed is best for sowing. If the seed has been badly heated or injured by moisture, it will be indicated by a darker color and diminished luster.

Once in four or five years at furthest it will amply repay the flax grower to procure fresh seed for sowing of good stock from some distant locality of a different climate. The indications from experience are that stock flaxseed is best when brought from a more northern region. The fine flax of Belgium and Ireland is chiefly grown from Riga seed, fresh importations being sown each year, or, at most, every second year. The growers of fine flax in Canada, and in the two or three counties in Eastern New York where flax is the leading farm crop, well know the benefit of frequent changes of stock for sowing. With them the Russian or Riga flaxseed is in best repute, the stock from which will exhibit superior crops for several successive years.

Large quantities of Canada flaxseed have been taken to Illinois, Wisconsin, and Iowa, in the last two years, and sown with excellent results. Riga seed, also, has produced flax in Illinois, of twice the length of that from common western flax seed in the same field.

The practical fact in this matter of the change of stock flaxseed appears to be, as is the case with wheat, hemp, and many other plants, that, when taken from where it has been grown to a distant locality, where the difference of climate, and perhaps of soil, also, is favorable to the result, the seed has the power to reproduce plants of superior vigor. This superiority of the fresh stock continues through several generations of reproduction, but is gradually lost. In a country like our own, of continual varieties of soil and climate, it would seem unnecessary to send abroad for choice stock flaxseed. A new variety of flax has white blossoms and pale green seeds, unlike the delicate sky-blue flowers and copper-colored seed of the common flax. It is said to have originated in Champaign county, Ohio, about fifteen years ago, from a single stalk, found by a farmer growing in his flax field. The seed of this variety is equally good for oil making, and the plants are of somewhat taller growth than flax from common western flaxseed. When the two are mixed in sowing, the green seed stalks have been observed to overtop the others by a few inches, and thus, by unequal growth, the crop is injured. By poor cultivation and long reproduction in the same soils and climate, most of the green seed stock of flax, like the common brown seed of the West, has lost its early superiority. But as it is a good lint flax, also, it may be expected to do well when sown in distant localities. Still it has no marked excellence which should give it preference, as a variety, over good stock brown seed.

Calcutta linseed, so largely imported from India for the manufacture of linseed oil in our eastern cities, is the product of a tropical variety, different from our most useful flax, and is not suited for cultivation in this climate.

SOWING FLAXSEED.

As before said, if the land has been well prepared and the weather continues favorable, flax may be sown as early as the first of April. This is given as about the earliest date at which flax should be sown in the latitude of St. Louis. As a general rule, it is best to sow flax as early in the spring as the land can be put in good condition for receiving the seed. Exceptional seasons may occur when late sowing may make the best crop, but in three years out of four the early sown flax will afford the greatest yield of lint and seed.

The young flax is not killed by exposure to the spring frosts, unless frozen just as it appears above ground and displays its two small radical leaves. The early sown flax has more time to develop its roots and other vital organisms during the moderate temperature of the spring, and hence it suffers less from the heats of the early summer. Besides, such flax ripens earlier, and, therefore, is less liable to suffer from rust, which sometimes injures late sown flax.

With these views of preference as to time of sowing, yet it is well known that most cultivators favor a time from the middle of April to the middle of May, and often get fair crops from the late sowing.

After completing the preparation of the land, as before directed, should the farmer have been unable to sow and cover the flaxseed directly, he must bear in mind that a finely pulverized surface of fresh soil is requisite for the reception of the seed. If, during any delay of the sowing, the surface has become dry or compacted by rain, the harrow will again be needed to refit the seed bed. The even distribution of flaxseed in sowing is of much importance to the success of the crop, and, by hand sowing, it is one of the most difficult jobs of farm labor. Aid will be afforded to this operation by marking off the land into strips of a uniform width, convenient to broadcasting by hand. Then compete the area of each division and the quantity of seed which should be sown on each. Some cultivators practice soaking the flaxseed in water until slightly adhesive to the hand, and then rolling it in common ground plaster. This prevents all inconvenience in sowing from the natural slipperyness of the seeds—makes them better visible on the ground for the guidance of the sower, and hastens their germination. The centrifugal broadcast grain-sowing machine is said to be used with excellent results in sowing flaxseed. It is claimed for it that it does the work evenly, sows any quantity to the acre, at the control of the operator, and can sow more ground in a given time than by any other known way. In determining the quantity of flaxseed to be sown to the acre, the farmer will be mainly guided by the object of his crop—whether for seed alone, or for both seed and lint. When grown for seed only, three pecks of sound seed to the acre is the smallest quantity to be sown that his interests will justify. If he sows one bushel, or even five pecks to the acre, he may expect larger crops of flaxseed, on the average, than when less than one bushel is sown. It is known that an opposite opinion is widely prevalent. But this seems to have its origin in the extensive practice of loaning flaxseed for sowing to the farmers in connection with contracts for the crops of seed by the manufacturers of linseed oil, who generally limit their customers to one-half bushel sown to the acre. The evidence derived from western experience is abundant, however, that the heavier seeding for flax will yield larger crops of flaxseed than when the lesser quantity is sown. In raising flax for both seed and lint not less than one bushel should be sown to the acre, and with an increased quantity up to two bushels, when the finest flax lint is sought, and the quality of the land is found to be suitable. Thick sowing, on good flax land, produces a tall thick growth of the stalks and fine lint. On poor land or in an unfavorable season the flax will grow and be deficient in quantity. Some examples of sowing one and one-half to two bushels of good stock seed in the West have resulted in extraordinary crops both of seed and of fine lint. These successful instances go to show that we have soils which will bear heavy seeding for flax, approximating the practice in the best flax-growing districts in Europe, where two bushels to three and a half are the usual quantities sown to the acre for fine flax. But to determine the proper quantity to be sown with reference to the best returns of both seed and lint, must be sought by careful experiment in each western locality of flax culture. Experience hitherto does not warrant any general rule beyond what is above indicated for seed crops, save that fine lint flax is only grown from thick sowing, and the thinner the sowing the coarser the fiber and the less its quantity.

Flaxseed requires but a slight covering of earth for its germination. Good crops have been grown from seed only covered by the action of a heavy shower or of a field roller. A common mode is to cover it with a light harrow, and sometimes crossharrowing the second time over. This will aid to further pulverize the surface, and equalize the distribution of the seed, if there has been a deficiency in either particular. But if the preparatory tillage has been thorough, as directed, a brush drag is best for covering the flaxseed. This implement is made by boring auger holes a few inches apart in a scantling eight or ten feet long, into which are fastened the buts of tough, thick-topped bushes. Chains are attached to the scantling, by which a team draws the drag.

After the harrow or brush-drag, a field-raker should be used on the flax field. This compacts the earth about the seeds, and, by further leveling the surface, it aids the subsequent use of the harvester in cutting the crop when ripe.

As hand-weeding the growing flax, according to European practice, is not justifiable by the prices of labor here, the farmer may now leave his field for the expected crop to be elaborated by the genial influences of air, rain, and sunshine. Meanwhile, before the harvest, there will be leisure to investigate the much agitated question—

IS FLAX AN EXHAUSTING CROP?

To this the popular tradition replies in the affirmative, and we are often warned not to impoverish our fields by flax culture. But unquestioned chemical analysis of the ripened plants of wheat and flax shows that, in average crops of each to the acre, the wheat has taken from the soil fourfold more of the fertile elements, or plant food, than the flax has absorbed.

There must be, then, some obscure cause for this wide discrepancy between the common opinion and the results of scientific investigation. This is evidently explained by considering that the growth of a flax crop leaves the soil in a peculiar chemical condition, which, while favorable to the after growth of some kinds of plants, yet is quite detrimental to the growth of other kinds, until the state in which flax leaves the land has been changed by time, or by the cultivation of some other crop. This is exemplified, on the one hand, by following flax with wheat, in which case an extra fine crop of the latter may be expected; but follow flax with corn, or potatoes, and most of the tilled crops, and the land will appear to be inert and barren. The tradition to the discredit of flax doubtless had its origin in planting the last-named crops directly after flax. The results of growing wheat after flax, by a like inconsiderate reasoning, would lead to the conclusion that the flax crop fertilized the land, instead of exhausting it. Hence a comprehensive investigation of the question will show that flax is not, comparatively, exhausting to the soil on which it is grown, but it should be cultivated only in a judicious rotation, and followed by approved broadcast crops, rather than crops which are tilled during growth.

Flax has always been regarded as well suited for seeding and laying down to clover and grass. While growing it shelters the tender plants of the latter, and the flax crop is removed in time for their favorable growth afterwards.

HARVESTING FLAX.

The time to gather the flax crop is indicated when the seed bolls begin to turn to a rusty brown color, and most of the seeds have become dark and hard. Harvested at this early period of maturity, the flaxseed will afford more oil, it is said, and certainly the lint is of better quality than when the flax stands until it is dead ripe. The portion of the crop, the seed from which is to be reserved for future sowing, should stand until it is fully ripened.

From the days of antiquity down to the invention of Obed Hussey's reaper, flax was universally gathered by hand-pulling. This is still the practice in Europe and in our eastern States, where flax is grown for the production of scutched fiber. But the slow, laborious hand process has been discarded in the West, in favor of the harvesting machine, the use of which has here greatly facilitated the pursuit of flax culture. When the flax has been grown for the seed only, and there is no sale or use to be made of the crop of flax straw, any common grain harvester may be used to cut the flax at such a hight as will merely save all the seed bolls. From the platform of the machine the flax is to be raked to the ground in gavels, and there lie until it is cured and dry. In cutting flax by a machine it is found that the knife-edged, or mowing sickle, works better than the serrated grain sickle. With a good growth of the flax stalks, if there is a flax mill or a tow machine in the vicinity, the flax should be cut as low as possible in harvesting it, to save the greatest length of the straw. For this purpose a grass mowing machine may be used, unless it is desired to keep the flax straight and bind it. In the latter case, use must be made of a combined reaper and mower, set to cut close to the ground, and the flax should be raked off into gavels, as straight and evenly as possible. The bundles should be made of only five or six inches diameter, keeping the stalks straight and even, and it is best to bind the flax as soon as it is cut. Done at this time, it is bound more easily; the grass (if any) can be shaken out of the butts of the gavels by the binder, and, set up in shocks of a dozen or more bundles, standing on their butts, the flax will be cured in a few days of dry matter, and injure less in a wet time than if the binding is put off.

The flax thus cut by machinery is harvested without any valuable loss of fiber, as the lint grows thin on the stalks near the ground and runs out above the roots. The stalks can be kept as even, straight, and unentangled in the bundle as if pulled, and for all of the subsequent handling the separation from the roots is much more convenient than to have them retained, as are pulled flax. Flax is required to be put into bundles to keep the stalks even and parallel for preparing scutched fiber, which demands the longest and finest flax; and it is also bound for threshing, and the removal of the branching tops when the quality of the lint justifies its preparation into machine tow, of extra fineness and value.

When the straw of the flax crop is to be used for making a common quality of machine tow, it is not necessary to bind it, but it goes as tangled or loose flax, to be handled in bulk like hay. This should lie in the swath or gavel only so long as may be required for it to cure, when it should either be threshed and stacked, or put into stack to await threshing. The too common practice among western flax growers of allowing the flax to lie on the ground for an indefinite time after it is cut, cannot be too earnestly reprobated. If the weather happens to continue fair, the seed may keep bright, but there is wastage from its shelling out and from the work of field crickets, while the straw is injured by sun-burning and dew-rotting on the upper side of the gavels. In case the weather is wet, the straw is unequally harvest-rotted, which gives a weak, harsh, foxy-colored tow, of almost worthless quality, while the seed is swollen, blackened and spoilt.

THRESHING FLAX.

This is done either by tramping out the seed with horses, or by machines. In the former way, which is only suitable for tangled flax, it is best done on a plank floor, of such dimensions that the animals can move around in a circle. When this cannot be had, a smooth, hard place can be prepared on the ground, if the soil is suitable, by tramping it with horses, and brushing off loose earth with a stiff broom.

The flax is to be thinly spread upon this circular track, and the animals driven over it. The use of a field roller, drawn by the animals, is found to be even more efficient than the tramping, both in preparing the tramping circle and in crushing the seed-bolls of the flax. The flax is turned, to be acted upon evenly, and when the seed-bolls are seen to be removed the straw is tossed with a fork to shake out the seeds, and then taken from the track to be either stacked or rotted.

Successive batches of flax are thus threshed. If the circular track becomes incumbered with seed and chaff, it is raked off and drawn up in the center of the track. The flaxseed is cleaned by using a common fanning mill, fitted with flax sieves and perforated tin-plate screens, suitable for separating any foul seeds which may have grown with the flax.

Flax straw, which is to be saved for the lint, should, in all cases, be carefully secured from exposure to the weather, by stacking or otherwise, until it is handled for rotting.

Tangled flax is extensively thrashed by the use of the common grain threshing machines. But their construction is not well suited to do this work with economy of power, and they are especially objectionable because they generally so cut up the flax straw that it is made of no value for the production of tow. A new wheat thresher, which does its work by the rubbing action of a corrugated cylinder, is said to, also, thresh flax rapidly, without injury to the straw. When it is considered that crushing the flax-bolls also detaches them from the stalks, and the mere shaking of the straw removes from it the loose seeds, it is evident that simple forms of mechanism may be adapted to do this with comparatively little power. On this idea a portable horse power flax thresher has lately been invented, by which the tangled flax is fed to an automatic feed-equalizing attachment, which conveys it, in a thin sheet, between a pair of rapidly revolving pressure rollers, which crush the seed-bolls without crushing the seeds, and throw the flax to a revolving toothed cylinder, about eighteen inches distant. By the action of this cylinder, moving at high speed, the flaxseed and chaff are driven through the bars of a concave below, while the cleaned and unbroken straw is thrown out from the machine behind the cylinder.

Straight flax in bundles was formerly threshed by beating the heads of the bundles upon a stone, or pulling off the seed bolls by drawing the tops over a ripple, which is a sort of coarse comb, made by fastening a row of pointed wooden or iron rods upright in a plank.

Machines driven by horse power are now chiefly used for threshing straight flax. By one of these the heads of the flax are passed between two plain iron rollers, which are pressed toward each other by a strong spring. The heads only of the flax pass between these rollers, which are short, and attached on the ends of their respective shafts, outside of the frame of the machine. The workman holds the bundle in the direction of the axes of the rollers, and by repetitions of their action the seed bolls are all crushed and removed. A still more rapid and effective machine—of late invention—consists of a toothed cylinder hung on a tight frame, to the rapid revolutions of which the workman presents the head of a flax bundle, from which the seed bolls are instantly stripped, and fall below, through a grated concave, into a hopper, which directs them down to a pair of iron rollers, so adjusted and operated that they crush and rub open the bolls, without mashing the flaxseed. A winnowing and screening apparatus is sometimes also attached and operated below the rollers, by which the flaxseed is cleaned as fast as it is threshed.

A peculiarity of this machine is found in its removing the seed ends or branching tops of the flax stalks, at the same time that it takes off the seed bolls. This operation cannot be too highly commended, as a new and valuable preparatory process, which facilitates all the subsequent treatment of the flax, in rotting, breaking, and cleaning, and increases the value of the tow produced. The tops of the flax stalks are brittle, and easily broken off in the unrotted state. Moreover, there is very little fiber upon them, yet just enough is shown after rotting to retain the tough tips and the receptacle of the bolls. These seed ends, as they are called, are attached to the ends of minute fibers, and rotting neither loosens, softens nor disintegrates them. In scutching, to prepare line flax, the seed ends are most difficult of removal, and as they are very numerous and generally fly off with a short filament of fiber attached, they become entangled in the scutching tow and deteriorate its value. For the same cause, in working flax for machine tow, these seed ends go in the tow, from which no mechanism yet devised avails for their entire removal, either in the flax mill or in the linen factory. Each seed end entangled in the fiber becomes the nucleus of a knotted lump in the tow, which unfits the material for spinning into fine, even yarns, however fine may be the quality of the fiber. This cause alone makes a difference of from two to five cents a pound in the market value of fine-linted flax tow.

For the use of the linen factories in the Eastern States, large quantities of foreign hackle tow of flax are now annually imported at high prices. This imported article is fine, clean, and has no seed ends in it; therefore it is suitable for manufacture into the finer kinds of goods. To supply from the products of the West this eastern demand for fine, clean tow, and also a growing demand at the new linen factories in our own section, we must first raise fine lint flax by thick sowing, then harvest it straight in bundles, and thresh with the machines which will take off all the seed ends of the flax stalks simultaneously with the removal of the flaxseed.

In making machine tow from tangled flax straw, which has not been put into bundles for the removal of the seed ends in threshing, more or less of these inevitably go in the tow; yet this is the almost universal condition of its present production, and such tow is used in the manufacture of the coarser class of fabrics, for which it is alone adapted.

ROTTING FLAX.

As in the days of antiquity, so now we still rely upon the natural agents, water and air, for rotting flax—experiments with chemicals having afforded no economical substitute. The hard gummy substance which cements the fibrous bark to the woody stem of the flax plant contains an active fermentive element or principle, which is developed by the presence of moisture. This gum must be decomposed and loosened, before the useful fibers can be easily separated from the stems, or can be made suitable for manufacturing. The decomposition is effected by immersion in water or by exposure to rains and dews, appropriately and respectively called water-rotting and dew-rotting.

In rotting flax, care is to be taken that the fermentive process be arrested as soon as the fibers will readily separate from the stalks, and before decomposition reaches the finer substance, which cements together the ultimate fibers forming the long filaments of useful flax. These ultimate fibers or cells of flax, are of extreme fineness and fragility—at most but two or three inches in length, and when the filaments which they compose are disintegated by decomposition, the material is overrotted and useless for spinning purposes. Straight flax for scutching is dew-rotted by speading it thinly in swaths or rows about one foot apart, on close fed grass land. The stalks are to be laid in spreading, straight, and parallel, at right angles to the direction of the rows of flax. Exposure to the rains and dews for a period of from three to six weeks, according to the temperature and amount of atmospheric moisture, will, in ordinary fall seasons, complete the rotting. The test of its sufficient completeness is to break a few stalks in the hands, when, if the fiber readily separates from the stem, and this condition is observed to be uniform, the flax is ready to take up. To secure uniformity in the rotting, it is found necessary to turn over the flax, when a marked change of color shows that the upper side is considerably advanced in the process. This is done by running a light pole, by hand, under one edge of the row and lifting the flax over.

It is matter of experience that flax will dew-rot soonest when spread on wet land; also, that the effect of rotting flax is equal as a fertilizer to a light top dressing of manure, to the grass land upon which it is spread. This, doubtless, is caused by the substances washed off from the flax in rotting, including the gum and soluble coloring matter of the stalks.

When the flax is rotted it should be raked up dry, kept straight as it is bound in large bundles, and be housed or securely stacked without delay. In dew-rotting tangled flax straw, the preparatory condition of the material for making common machine tow, it is to be spread by hand evenly upon the land, without effort to have the stalks parallel, covering the ground at the rate of one and a half to two tons to the acre; also, when the upper side of the straw is observed to be nearly rotted, it should be turned bottom side up with a hay fork. The fall months, commencing with the middle of September, and thence on to December, are most favorable for dew-rotting. If spread out early for the first batch, two rottings can be taken from the same ground by Christmas time, in seasons when the autumn rains are of the usual frequency. Warm weather, with rains, hastens the process, but without dews or rains flax will lie for weeks almost without change. Spread out for rotting in the hot months, the flax, by becoming sunburnt, is liable to produce a weak, rough and towey fiber without deficient weight. Lying under snow for two or three weeks in winter will often rot and bleach flax to an excellent condition; but if the snow is deep and lies too long on the flax, it is liable to be overrotted and injured before it can be taken up. Exposure in cold winter weather without snow or rain will not change the condition of flax, but in a climate of occasional rains, slight snows, and alternate freezing and thawing, winter rotting will result well. Spring rotting, though sometimes practiced, cannot be commended, as the longer days of sunshine and drying winds tend to make the process slow and the product of lint light and flossy.

Flax for many reasons should be dew-rotted on the farm where it is grown. It is a benefit to the land on which it is spread, and losing nearly one-fourth of its weight by rotting, it can be handled more easily to a neighboring flax mill, and it has an increased value there considerably more than the cost of the necessary handling for rotting it.

Inexperienced cultivators should use care not to injure the quality of their flax by overrotting, or by unequal rotting from uneven spreading, or neglect to turn it on the field at the proper time. Rotted flax will not turn rain well; therefore, when stacked it should have a cap of straw or coarse hay, and the stack should be raised from the ground sufficiently to keep the flax from absorbing moisture therefrom.

In water-rotting flax, soft water is far preferable to that which contains lime or other mineral ingredients. It has more solvent property than the latter, and it also expedites the process and produces a softer and more workable quality of fiber.

In preparation for this business it is best to have a rotting pool arranged for the water to be withdrawn and admitted at pleasure. Into this, when empty, the bundles of flax are compactly placed in an inclined position, of as many tiers as the depth of the pool will admit.

The flax is then to be covered with planks heavily weighted, to keep it from floating when fermentive gases are developed. After water is admitted, covering the flax, in a few days the escape of bubbles from the surface will indicate the progress of fermentation. When the bubbles begin to diminish in frequency it is best, from day to day, to examine the state of the flax. If sufficiently rotted it will be shown by the fiber slipping easily from the stem when manipulated for this test, or stalks of the flax may be dried and then tried, as for dew-rotted flax. When sufficiently done, the bundles are removed from the pool and the flax spread out on grass land to dry and bleach for several days before rebinding and stacking. The same general directions answer for water-rotting tangled flax straw, which, from its condition, is handled in bulk.

Steep rotting flax in vats, with the temperature of the water raised to about ninety-five degrees, by steam pipes or otherwise, has been referred to. By the artificial heat the fermentation of the flax is accelerated, and the process of rotting reduced to a period of two to four days, according to the quality of the water and the condition of the flax. The temperature being controllable, this method can be employed at all seasons of the year, and is well suited for use in connection with flax mills, which work either straight or tangled flax. The general management in steep-rotting is the same as directed for water-rotting at the natural temperature. The fiber produced by either mode is, on the average, stronger, more uniform, and less towey than that of dew-rotting flax, and is more suitable to be made into articles which are to be used in water or in exposure to the weather. On the other hand, it is proper to state, that from the great development of sulphuretted hydrogen gas in steep-rotting, the stench is considerably worse than in water-rotting, and neither can be regarded as healthful pursuits in any region subject to fever and ague.

BREAKING AND CLEANING FLAX.

The preparation of flax fiber for the general market, whether in the form of scutched line from straight flax straw, or of machine tow from tangled straw, has been almost exclusively carried on in flax mills located in the flax-growing districts. No effective machine of a suitable kind to do this work economically on the farm has yet been introduced. That such machines will soon be produced to meet the requirements of the existing demand, at least for the preparation of fine machine tow, may be confidently expected.

Still, the preparation of flax fiber in central mills, as a distinct branch of the business of its production, has special advantages which doubtless will secure the perpetuity of the system. Of mill machinery for preparing scutched flax or long line, that system is in most successful and general use which breaks the flax stalks by passing them between pairs of fluted rollers in one machine, and cleans the fiber from the shives, or broken fragments of the stems, by a different machine. Some of the breaking machines in use have only one pair of coarse-fluted, adjustable pressure rollers, between which a large handful of the flax stalks is repeatedly passed. Others have more pairs and smaller rollers, intended to break the flax by once passing through the series. One machine, of the latter class, has a reciprocating rotation of the rollers, a little faster forward than backward, thus giving repetitions of the action on the flax. It does excellent breaking, but is comparatively slow of operation, and from the peculiarity of its mechanism it cannot be made durable. The scutching machine in use consists of a wheel made of knife-shaped, blunt-edged blades of hard wood or iron, made fast, radially, to a horizontal shaft by which it is revolved, about one inch distant from the side of an upright board. The latter has a notch made in the edge, remote from the axis of the wheel, or about the same hight from the floor as the shaft, and placed opposite the outward ends of the blades, which revolve in a circle of about five feet in diameter. On the horizontal lower edge of the notch in the scutch board the workman holds a handful of the broken flax, alternately presenting both ends of it to the action of the revolving blades by which it is cleaned. About one-fourth of the fiber is whipped off with the shives, and however carefully shaken out it is of little value, from the admixture of shives and seed ends with the lint. Much practice is requisite to acquire expertness in the use of the scutching wheel, but, with skill of the workman, it may be considered as the best apparatus yet produced for the like purpose.

In preparing line flax, or dressed flax, as it was called of old, for domestic manufacture, on the small scale, the hand brake and swingling knife and board of our ancestors is still used, though to a far less extent than formerly. The flax is afterward dressed on the hand hatchel, otherwise called hackle. This consists of tapering, pointed steel pins, thickly set in several rows, by driving them through a short board, from which the pointed ends project about five inches. The short fibers or tow, combed out from the long fibers by the hackle, is prepared for spinning on the large hand wheel by carding on hand cards, while the dressed line from the hackle is ready to be put upon the distaff of the small foot spinning wheel.

In our linen factories the line flax is chiefly hackled by hand, although in Europe costly machines are in use for this purpose. The dressed line is worked and spun on power machinery, quite different from that requisite for the manufacture of tow. Flax tow is worked on carding machines, which deliver it in thin, narrow ribbons of fiber, called slivers, which run into large tin cans. These, when filled, are successively removed to the machines for drawing and spinning; the slivers from several cans being united as they run out, are together drawn out into a single thin sliver, to equalize it, and give evenness to the yarn. Machine tow, made from tangled flax straw, is manufactured in the same way as hackle tow. Jute, also, with the requisite preparation of the fiber, is manufactured on the same machinery as is used for flax tow, and the same can undoubtedly be done the fiber of hemp, properly prepared for this purpose.

The machines in general use for many years in flax mills, when flax tow is made from tangled flax straw, consist of a breaker for breaking the flax stalks, and a picker for cleaning the fiber. The former machine is made up of ten or more pairs of fluted rollers, and the gang of pairs are set about one inch apart, side by side, on a horinzontal frame. The top rollers of the pairs have springs or weighted levers bearing upon their movable journal boxes, which gives adjustable pressure to the rollers. The bottom rollers of each pair in the gang are geared to be driven with the same speed of revolution for all, and the top rollers are revolved by the interworking of their flutes with those of the lower rollers, upon which they rest. The machine having been put in rapid motion, a workman presents a handful of tangled flax straw to the bite of the first pair of rollers, from which it passes horizontally between the rollers of each pair, and is discharged at the opposite end of the machine. From the interlaced and entangled condition of the flax straw the action of the flutes of the rollers is less favorable than if the stalks could go through straight and parallel to each other, and it is necessary to pass the material thrice through the machine to effect thorough breaking. Care is required of the workman that, while keeping his hands from being caught by the rollers, he does not allow the flax to enter the machine in thick bunches, over which the top rollers will rise without crimping and breaking the stalks.

From the nature and condition of the tangled flax straw, such are the difficulties of hand-feeding directly to the fluted rollers that the latter, which must revolve at high speed to do good breaking, are usually run empty two-thirds of the time, from the inability of the feeder to suitably supply the material fast enough to keep up with the working capacity of the machine.

To remedy the difficulties from the material and the incompleteness of mechanism above indicated, an automatic feeding apparatus for tangled flax has been lately invented, which can be attached to all kinds of fluted roller breakers between the first pair of rollers and a feed table. From the latter it receives the material presented in a layer six or eight inches thick, and impaling it upon the long teeth of a slowly revolving cylinder, it is advanced to the fluted rollers, by the more rapid movement of which it is drawn away from the teeth, and passes through all the rollers in a continuous, thin, even sheet of disentangled and straightened flax stalks. One passage of the flax through the rollers, with aid of this feed-straightener, breaks the stalks as thoroughly as twice through by direct hand-feeding to the rollers. And, as the workman can easily handle three times the quantity of flax straw in supplying it to the feed-straightening attachment that he can feed, in the same time, by the old mode, the working capacity of the breaking machine is actually increased six fold by the adoption of the improvement.

The pickers generally used for preparing tow in flax mills are composed of a cylinder studded with pointed steel teeth, to which, when rapidly revolved, the broken flax from the flax-breaker is slowly advanced by a pair of plain pressure rollers, which have received the material from a moving, endless feed apron, upon which it is spread by hand. It is customary to pass the flax twice through the picker, in making clean spinning tow. The material is thus handled to and from the machinery in the flax mill four times each, twice to and from the breaker and twice to and from the picker, before it goes to the baling press.

By the attachment of the automatic feed-straightener to a fluted roller flax-breaker above described, it was observed that the flax came from the last pair of rollers in a thin and uniform sheet of the straightened, broken stalks. This was evidently the very best condition in which the material could be presented to the action of a picker cylinder, for separating the shives from the fibers, without tearing them into short pieces. Far more favorable it seemed than the matted, interlaced state of the broken flax, when it is handled for spreading on the feed-apron, and compressed as it passes between the feed-rollers to the picker cylinder in the common way. This suggested the attachment of a picker cylinder to the rear end of a flax-breaker, which had a feed-straightener at the opposite end. The picker teeth acted upon the broken flax, as it was advanced to it, by the last rollers of the breaker stripping off the shives, which were driven through the grated openings of a concave below, while the fibers of the flax were thrown out behind the cylinder is the condition of tow.

Subsequently, with a view to the preparation of fine spinning tow with the greatest rapidity, other toothed cylinders were attached to receive and rework the tow from the first one, with due provision for passing it through the whole series. Improvements were also made in the picker-teeth and in the attachments for the escape of the shives below the cylinders, and of their separation from the fibers. The result of these improvements and combinations is the production of a flax-tow machine which easily works one ton of rotted tangled flax straw in an hour, making therefrom five hundred pounds of clean spinning tow at the single operation.

HEMP LAND.

For hemp culture there is required a rich, kindly soil, in good heart, free of weeds, and especially it should be of the quality which endures well the extremes of wet and dry seasons. To find such lands the subsoil must be examined as well as the surface. The quality and condition of the subsoil determines the depth to which the roots of plants can penetrate and find moisture and nutrition. More important still, the subsoil also determines whether rain water can pass freely downward in a wet time and moisture ascend by capillary action to the surface in a dry time. Millions of acres of the fertile corn lands of the Western States have surface soils entirely suited to the growth of hemp, but from the retentive nature of their clayey subsoils, until thorough underdrainage of the land is adopted, hemp cannot be successfully cultivated year by year. Such drainage can be made by underdrains sixteen feet apart and two and a half feet deep, at a cost of less than six dollars an acre, using for the purpose a mole drain machine recently adapted to thorough field underdraining in dry subsoils, and also contrived to reopen the drains when needed.

In entirely favorable seasons fair crops of hemp can be grown on rich, clean, well-tilled land almost anywhere in all this region; but in years when a part of the growing period is very wet or dry, hemp will fail, except where there is drainage through the subsoil. Soils which afford such natural drainage through the subjacent earth and yet are not too leachy, have hitherto been sought for hemp growing. They are found here in great perfection on the alluvial bottoms of the Mississippi and Missouri rivers and of some of their branches, and especially in the counties bordering on the river in the western part of this State.

Doubtless favorable localities and the areas of land naturally suitable for hemp, on wider investigation, may be found more numerous and extensive than has been supposed, both in this and the neighboring States. The test for ascertaining this is simple, on any land in cultivation. If the ground is rich, does not hold water standing on the surface after heavy rains, and in a drouth does not bake and crack, but has moist earth within two or three inches of the surface—such land possesses the right kind of subsoil, and will do for hemp culture. It is well known that hemp, on congenial soils, is not exhausting.

PREPARATION OF HEMP LAND.

To fit land for a hemp crop the tillage should have reference to the suppression of grass and weeds, the deep-stirring of the soil for the extension of the hemp roots, and to a well-pulverized surface for the germination and nourishment of the young plants.

These objects are best attained by deep plowing in the fall, and a more shallow plowing in the spring, followed by thorough harrowing before sowing. Some hemp growers have recommended shallow plowing early in the fall to cause the seeds of weeds and noxious grasses to sprout at that season and be killed by the frosts of winter, with deep plowing the following spring. Others more wisely reject this plan of culture in the belief that most of the weed seeds will not germinate in the fall, but lie dormant until spring. They choose deep plowing in the fall that the winter frosts may disintegrate the plowed surface, which is further loosened by the shallow plowing and harrowing in the spring, by which, also, the early weeds are destroyed.

As labor saving is now more than ever important in connection with hemp culture, the use of some one of the gang-plows of approved patterns for the deep plowing, and of the field cultivator for the shallow spring tillage, is suggested. Sometimes heavy rains, after the deep fall plowing, may beat down and compact the ground to a considerable depth. Whenever the soil is observed to be in this condition in the spring, a deep plowing should then be given, with other tillage requisite to put the surface in a fine, loose state.

On the rich lands of the hemp districts in Kentucky and Missouri, it is a usual practice to grow this crop upon the same ground year after year, some fields having borne hemp twenty to thirty years in succession without exhaustion. The directions for plowing, above given, have particular reference to this system of following hemp with the same crop. But hemp is also successfully grown on well-decayed prairie, meadow, or clover sod, and also after corn and most clean crops. In some of these instances the preparatory deep fall plowing is impracticable, in which case the spring tillage of the land must be modified accordingly.

Subsoiling hemp lands once in three or four years and bringing it to the surface will richly repay the extra expense, as will, also, every second year, the use of the subsoil breaker, now made as an attachment to common plows.

It is well known that the too frequent practice in western hemp culture is to neglect fall plowing, and depend upon a single plowing in the spring, with once harrowing before sowing. This course can be generally relied upon to produce indifferent hemp crops, and crops of weeds increasing with the hemp year after year. Finally, the land will not pay to grow hemp upon it, not because of its exhausted fertility, but the weeds have monopolized the soil. Both the remedy and the preventive of this is by early fall plowing and thorough spring tillage, by which hemp land will become more clean of weeds and grass the longer it is in cultivation. As a field of good hemp, well managed, may be expected to afford a large profit to the owner, while poor hemp may not pay expenses, thorough and timely tillage for this crop is obviously the best economy, and will alone insure success.

SOWING HEMP.

The time for putting in the hemp crop in Missouri is from the middle of April to the 20th of May, according to the advancement of the season and the convenience of the farmer.

It is a usual practice when the early time for sowing hemp has come, to plow, harrow, and sow a few acres at a time, and thus go over the field in successive patches, often prolonging this operation for a month or more. This plan is in favor, partly because of its convenience in connection with the prosecution of other spring work. Besides, the chances which the ensuing season may afford in favor of either early or late sowing are better covered by distributing the times of putting in the crops; and different portions of it thus ripening in succession, the harvesting of the hemp is also better accommodated.

The ground should be harrowed immediately preceding the sowing, to give a fine seed bed of fresh earth. Four to five pecks of sound hemp seed to an acre is the usual rule in sowing this crop. If more is sown to the acre it should only be done on land of extra fertility and good tillage; otherwise, with too thick sowing, it is found that the plants of the hemp are liable to grow unequally, some coarse and others fine. Uniformity in the size and length of the hemp stalks is essential to a good lint crop, and is a constant object with the careful farmer. To secure this evenness of growth it is of importance that the hemp seeds when sown should be covered to a uniform depth in the soil This may make no difference in the germination of the seeds when, at this period, the ground is moist to the surface. But it is often the case before the seed sprouts that the surface, for an inch or more in depth, becomes dust dry. If now the sowing has been by broadcast, and covering with a harrow, the seeds are buried at all depths down to three inches below the surface; consequently, the seeds lying deepest in the moist earth will first germinate, and their young plants may grow several inches above the ground before the occurrence of rains to wet the surface and sprout the seeds which were buried at less depths. In such cases the plants which have the start will overshadow the others, and there results a crop of coarse and fine hemp stalks commingled, the fiber of which is deficient both in quality and quantity.

To avoid this risk which attends broadcast sowing, many of the most successful hemp growers make use of the two-horse grain drill in sowing hemp seed. For this use the drill spouts of the machine should not be more than eight inches apart, and if adapted to make the hemp drills six inches apart there will be less danger of the hemp stalks growing crowded in the rows. As a precaution against the latter result, which is liable to induce an unequal growth, the farmer must use a few quarts less of seed to the acre than would be advisable in broadcasting hemp. In the use of the drill for hemp seed, thorough preparatory tillage is especially requisite to favor the working of the drilling spouts. Sowing hemp seed by hand, broadcast, is still chiefly practiced for this crop. Care and skill, to secure an even distribution of the seed over the surface of the field, are indispensable for a successful crop. Doubtless the centrifugal grain-sowing machines can be used to advantage for broadcasting hemp seed evenly and with great rapidity. When the sowing has been by broadcast, the hemp seed is to be covered by a light harrow, working the ground thoroughly and followed by the field roller, to even the surface and compact the earth about the seeds. Furthermore, by the use of the roller there is thought to be less danger that the surface will become dry to a depth which may result in an unequal germination of the seeds, as before referred to. Sometimes, directly after the hemp is sown, heavy, beating rains, followed by dry weather, have so incrusted the surface that the young plants cannot make their way to the light, and they perish. When this condition of the field is observed, it is best to go over the ground at once with a field roller, to break up and disintegrate the surface crust.

PLANTING SEED HEMP.

Hemp which is sown for its fiber is cut before the seed matures; or, if allowed to ripen, not only is it at the partial sacrifice of the value of its fiber, but the yield of hemp seed is small and its quality inferior.

To raise hemp seed for sowing, therefore, the farmer plants a separate field for this purpose, cultivating it in hills, with field tillage, about the same as for Indian corn. Growing in this way, the mature hemp plants no more exhibit the slender, reed-like form of thickly sown lint crops; but those bearing the seed are often stout, woody trunks, widely and densely branching for their entire length, and the twigs of the branches are thickly covered with sessile flowers and seed cells. It is customary to plant for seed hemp as early in the spring as the first sowing for the lint crop—dropping and covering eight to ten seeds in a hill. When the young plants are several inches high they are thinned out, leaving in each hill only three or four of the strongest.

Hemp, being of the diœcious order of plants, has its staminate or male flowers on separate plants from those bearing the pistilate or seed-producing flowers. The male hemp plants are less numerous and more slender, with fewer branches, than the other. Moreover, they are conspicuous, when maturing, from their pale yellow blossoms, and the abundant discharge therefrom of the fertilizing dust or pollen of the same color. As the average number of the male plants is in excess of the requirement for the fertilization of the seed-bearing plants, in the seed hemp patch, a considerable portion of them can be cut down, and leave more room for the expansion of the female plants. Some farmers are in the practice of exterminating all the male hemp stalks as soon as they are distinguished, in the belief that because they produce flowers only, with no seed, they are therefore useless and in the way. But this can only be done at the risk of a partial failure of the seed crop, for the germ from which each hemp seed is produced must first have been touched by an atom of pollen, floated to it on the air from a male hemp plant, and if there is a deficient supply of pollen a portion of the germs will remain unfertilized, and produce no seed.

Hemp, when planted and matured for the seed, is a great soil feeder, and both endures and repays heavy manuring better than almost any other crop. Twenty bushels of hemp seed to the acre is considered an extra yield on good unmanured hemp land; but, by manuring heavily, twenty-five to thirty-five bushels have been grown to the acre. The manure should be spread and plowed under deeply, and the hemp hills planted at least four feet apart, to give room for large, branching plants. The seed hemp stalks will continue to form and ripen new seeds until the arrival of autumnal frosts. The crop should then be cut by the hand corn-cutter, selecting for this purpose a time when the stalks are damp with dew, to avoid wastage by the shelling out of the early-ripened seeds. Also, when the dew is on, after cutting, the stalks are to be set up in shocks to cure.

The seed is threshed by hauling the hemp shocks to a field tramping circle and treading it out with horses, as before described for tramping flax. To prevent waste of hemp seed in hauling the stalks to the threshing floor, it is customary to place cloth sheets over the wagon rack or drag which may be used for the conveyance. The seed is cleaned by a fanning mill, using the same sieves as are used for cleaning wheat.

To preserve hemp seed sound for sowing purposes, care should be taken that it does not heat in bulk, neither on the threshing floor nor when put up for storage. First well dried by spreading, it can be safely kept in well-ventilated bins, or in sacks, boxes, or barrels, in a dry, cool place, not accessible by rats or mice. If kept from heating, age does not impair the quality of hemp seed for sowing uses, but if it becomes damp, or heats in bulk, its power of germination is destroyed; and, because of this great liability, caution is to be used in purchasing strange hemp seed. Volunteer, or uncultivated hemp seed, is not considered to be suitable for sowing, though sometimes used for the purpose, and it often finds its way to market, where it answers for bird seed.

VARIETIES OF STOCK HEMP.

There are three sorts of hemp known to cultivators in this country, viz: the common American hemp, Russian hemp, and Chinese hemp. There is no evidence that these are distinct varieties; but, by long cultivation in the respective regions where they are grown, the same plant, *canibis sativa* of the botanists, has acquired distinct local characteristics. At least the foreign kinds, when newly grown here, exhibit marked differences from our common hemp. Imported hemp seed from Russia was tried for lint crops in Kentucky and Missouri many years ago, and at first the resulting crops were far inferior to the product of the common seed. It is also said that, in the few instances where crops were reproduced from the Russian stock, an improvement was noticed, year after year, until it could not be distinguished from the common kind. This example goes to show that we are to follow different rules with hemp and flax, in respect to the relative latitudes in which we may find improved stock seed of each of these plants. It has before been noticed that Russian flaxseed, coming from a more northern region, when sown here produces luxuriant crops, and is preferable to all other kinds. We shall presently find additional evidence that, to get hemp seed of more productive stock, it must be sought for in the more southern instead of the northern regions of its cultivation.

About fourteen years ago an American, then in Paris, while visiting the Jardin des Plantes in that city, saw growing there some hemp plants of remarkable size. Obtaining, by favor, about a thimbleful of the seeds he inclosed them in a letter to a friend in Kentucky, for trial by cultivation.

The kind of hemp thus introduced was said to have originated in China, and hence has been called Chinese hemp. In a few years, from the stock sent in a letter from Paris, it had spread over the hemp-growing districts of Kentucky and Missouri. In the early period of its cultivation here it was found to grow much taller than the common hemp, producing, in some instances, nearly double the yield of fiber to the acre, and it matured about one month later, which made the time of its harvesting to occur in cooler weather. These were important advantages to the hemp grower. On the other hand, it was found on planting it for seed, with ordinary culture, that the average production was only about twelve bushels to the acre, and that it must be planted quite early in the spring to mature the seed crop before the time of autumnal frosts. Moreover, the fiber was often coarse and flaggy near the butts of the larger stalks, and the latter, from their great length and the greater solidity of their woody stems, made difficulty in breaking and cleaning on the hand brake.

Still this sort of hemp continued in favor with most cultivators in Missouri until, after a few years of reproduction from the same stock, it was found to have gradually lost its original characteristics, and scarcely to be distinguished in any particular from the common hemp. Whether this degeneracy of the Chinese hemp is traceable to the effects of climate and soil gradually exhausting the pristine vigor of the stock, or due to admixture with the common hemp by floral impregnation, or to both causes combined, there are no positive data for determining. No example is known where the early stock of this sort has been cultivated year after year, in a locality entirely isolated from other hemp.

The presumption is, however, that the variety originally came from a more southern region, as evinced by its maturing later than the common hemp, and it grows larger than the latter, because it continued to grow for a longer period. And when, by gradual acclimation, it ripened as early as the common kind, its productiveness became no greater than the latter. Be the cause what it may, the Chinese hemp in such high repute when first brought to this country is now degenerated, and fresh, pure stock is eagerly sought for. The large, long stalks which it produced in the early years of its introduction are now no objection, with the general use of power hemp breaks, and the larger yield of fiber to the acre would greatly encourage hemp culture by cheapening its production.

It is respectfully suggested that the Agricultural Bureau at Washington would confer a favor upon western agriculture by instructing its European agent to make inquiry at the Jardin des Plantes, in Paris, concerning the gigantic canibis sativa grown in the experimental acclimation grounds of that institution, sometime about the years of 1852 to 1854. Let him find out, if possible, whether the original seed of that hemp really came from China, or from Cochin China, and from what port, reached by American commerce, more hemp seed of the same sort can be obtained.

This information, communicated to the Missouri State Board of Agriculture by the national bureau, as early as possible, will be thankfully received by the hemp growers of this part of the country.

HARVESTING HEMP.

The time to cut hemp grown for the fiber is indicated by the dropping of leaves from the hemp stalks, most of the flowers on the male plants having passed their prime, and hemp seeds beginning to ripen on the female plants. If harvested much earlier than this, the fiber will be deficient in weight; and, if put off later, the lint of the female plants, by overripeness, will be coarser and of less value, while the decay of the male hemp plants will cause the partial loss of their fibers.

For cutting hemp, the strong, clumsy, heavy draft harvester, first introduced for this purpose, is still chiefly used, with an attachment to aid in delivering the cut hemp from the machine to the ground in gavels. Quite recently, in the principal hemp-growing district of this State, a simple hemp-dropping attachment has been invented, and applied to the well-known two-wheeled harvesting machines, with excellent results. Besides demonstrating the utility of the new dropping apparatus, it was also shown that, while machines of special strength are required for cutting hemp, the use of a mowing sickle bar with the common lozen-shaped sections does better work with less power than the more obtuse angled and serrated sickle edge of the old hemp harvesters. Four horses and two men are required in cutting hemp with the harvesting machine, one hand driving the team, and the other gathering and delivering the cut hemp to the ground in gavels, by aid of the dropping attachment. One machine will thus cut six to eight acres of hemp in a day. The hemp remains on the ground in the gavels until the stalks are well dried, when it is taken up without binding, and set up on the field in large conical shocks. The hemp should not lie too long on the ground, as it is then exposed to injury by sunburning and the occurrence of rains. In taking up the gavels for shocking, care is to be enjoined that the workmen even the butts and straighten straggling stalks, that the hemp may stand compactly in the shocks. Sometimes the shocks are secured more effectually against rains and winds by a cap sheaf and band of hemp stalks placed over the top of each shock. It is customary to make sixteen shocks to each acre of hemp ground.

ROTTING HEMP.

To avoid injury to the strength and weight of the fiber, if exposed to the hot sun at an earlier period, hemp is not usually put out to dew-rot until after the first of October, and thence to the early part of the next month. Before this time the land should be plowed, leaving only narrow lands on which the rows of hemp shocks are standing.

The hemp for rotting is taken from the shocks by hand, and spread evenly on the plowed ground in rows, side by side, the stalks lying transversely to the direction of the rows. In spreading, the workman, with an armful of hemp, walks backward, facing the row which he is forming, and drops the stalks with care, that they may lie even and parallel. An active man can thus easily spread an acre and a half of hemp in a day. The same amount of labor is also required in shocking hemp. It is found most convenient for the workman to carry along several rows abreast, as he spreads the hemp of one shock after another, in the row of shocks. When grass and weeds have grown and been harvested with the hemp, they should now be shaken out from each armful, as it is taken from the shock to be spread, if it has not before been done. The butts of the hemp stalks will not rot well when covered or mixed with grass and weeds in the spread rows. The foul grass and weeds removed from the hemp should be burned in pits, to destroy the seeds.

Nearly or quite all the surface of the field will be needed to spread the hemp upon when the crop is heavy. In such case, it is best, in fall plowing the hemp field, to also plow the land between the shocks in each row, by driving around them.

Hemp is generally spread too late in the fall to receive much benefit from the dews, and the process might, with less inaccuracy, be called field-rotting instead of dew-rotting.

When the early-spread hemp has been exposed to occasional rains, it will be ready to take up before Christmas. If the weather continues dry while the hemp is down, it will change very slowly, and it sometimes remains until the following spring before it is sufficiently watered. It is noticed that alternate rains and sharp frosts most rapidly affect the loosening of the fibers from the hemp stalks. To determine when the hemp is sufficiently rotted, break a few stalks between the hands, and observe whether the fibers part freely from the woody stems. If this is found to be the case uniformly, on the lower side as well as on the top of the spread hemp, it is time to take it up as soon as possible. By delay it may be exposed to additional rains, which overrot and injure the strength, weight, and general quality of the lint. The hemp is taken up by hand, usually by the aid of a short stick with a hook at one end, used to draw the stalks towards the workman, as by successive advances he collects an armful before him. In all the handling which the hemp receives, care is to be taken to keep the stalks parallel and their butts even. Rotted hemp, as fast as it is taken up, is either re-shocked on the field, or at once handed to the breaking machine, or to be stacked. In removing it from the field, it is laid across two scantlings about fifteen feet long, the forward ends of which rest upon the axle of a pair of wagon wheels drawn by a team, while the rear ends drag upon the ground. These drag poles are about three and a half feet apart, and kept equidistant by a brace which confines their rear ends, and there are also two upright stakes in the poles, about one foot from the ground.

On reaching the machine or stack with a load on the described hemp drag, by removing the stakes and driving forward the inclined poles will be withdrawn from under and the hemp be dropped upon the ground; or, by adjusting sling ropes under the hemp while on the drag, and the use of a common hay-stacking apparatus, the load of hemp can be raised by a horse attached to the hoisting tackle, and be deposited anywhere on the stack or rick of hemp.

Water-rotting hemp in pools at the natural temperature, and steep-rotting in vats by the aid of artificial heat, are processes entirely analagous to the treatment of flax for the like purposes; which having been elsewhere herein described, it is not necessary to reiterate.

PREPARING HEMP FOR MARKET.

The exclusive use of the old hand brake for breaking and cleaning hemp is still retained to a limited extent only. Missouri hemp growers chiefly use some one of the horse-power machines adapted to rough break and partly clean their hemp, the process being completed by a second operation on the hand brake. In the use of each of these machines the object has been to prepare the fiber in the condition of undressed hemp; though there is much unavoidable waste of lint in the operation.

Undressed hemp is prepared with the fibers of full length, and lying evenly in large handfuls, which are doubled at their middle and slightly twisted before the two ends are brought together, forming what is called a head of hemp. The heads are tied up in bundles of the size a man can carry, and hauled by wagon loads to the intended point of shipment for market. At the principal river towns and landings, in the hemp-growing districts of Missouri, there are large warehouses for storing hemp, which are provided with horse-power baling presses. The proprietors of these establishments make a business of storing, baling, and shipping hemp for farmers at a stated price by the ton. Instead of selling his crop to buyers at the first shipping point, as is generally done with the wheat, corn, wool, and other staple crops in other parts of the West, the hemp grower commonly has his hemp shipped on his own account to a favorite commission merchant in St. Louis.

This practice necessitates frequent, and often expensive, trips to the commercial metropolis of the State; and hence it is that hemp growers, as a class, probably know more about city life than any other numerous portion of our rural population.

Hackling, or dressing hemp by hand, is of late an increasing branch of industry at the principal river towns in the hemp counties, and, also, at St. Louis. The products of this laborious process are dressed hemp or long line, and hackle tow or the short hemp fibers drawn out on the hackle teeth. Dressed hemp is chiefly used for handspun twines. The tow is used in the manufacture of bale rope and bagging for cotton baling.

It has before been referred to, that machine-made rope and bagging are now exclusively manufactured of tow. The first operation on undressed hemp, in the factory, is to convert it into tow by machinery for the special purpose.

This fact suggests the economy of preparing hemp fiber in the form of tow on the farm or at the primary point of shipment, in connection with cleaning the material, and the recent introduction of machinery for this purpose has been mentioned. This movement, especially in the feature which proposes the production of a quality of refined, even-stapled tow, hitherto unknown, and suited for a variety of new uses, is deemed of great importance to the hemp-growing interests of this and of the adjoining States. In this connection alone there is promise of a cheapened and ameliorated system of hemp production, and, also, of a greatly increased demand for this fiber, which may encourage a vast extension of hemp culture, until, with its related home manufactures, it shall take its place among the foremost industries of the West.

MANUFACTURES IN MISSOURI.

Notwithstanding much space was allotted in the last annual report of the State Board to the discussion of the subject of home manufactures, as bearing upon the interests of agriculture in Missouri, as well as upon the general prosperity of the State, yet the truths there set forth, with others that every day's experience brings to light, cannot be too often nor too earnestly pressed upon the attention of the public. The authorities in whose hands have been placed the public interests of agriculture undoubtedly feel that this is a subject that should be fully discussed—that its intimate connection with the material progress of the State, and consequently the advancement of the special interests which they have in charge, calls for "line upon line"—for here a word of advice, and there a narration of facts, which shall eventually lead to the establishment of manufactories; and thus, while in a measure freeing Missouri from the drain that is now made upon her for eastern wares, shall add largely to the material welfare of her rural community.

In the brief space which will be occupied by this paper, we shall aim at the practical—giving facts rather than theories—showing what the establishment of manufactures has done for other States, and hence, the circumstances being similar, what it may do for Missouri.

In the earlier days of a State, when settlements are few and population thinly spread over its face, there must exist a great degree of dependence upon older and wealthier communities. With a narrow field for the sale of his wares, the manufacturer—say of agricultural implements and machinery—cannot afford to invest the capital necessary to the successful management of his business. He must have customers for the products of his shops; he must have around him a community that can supply him with the many articles besides wood and iron which his establishment calls for—with laborers in his shops, with provisions for his employes, with the thousand and one things such a business demand, else he fails. These he does not find in the woods nor on the open prairies. Hence in a new community manufacturers requiring any great investment of capital cannot be successful, and no prudent business man will seek such a location. But Missouri, throughout the main extent of her borders, has passed beyond this, and the field is now such an one as robs it entirely of the characteristics of a venture. In a large class of manufactures, such as implements pertaining to husbandry, household furniture, wagons, woolen goods, etc., the investment of capital may now be made with an assurance of a fair return of profits. And every day is making an addition to the merits of this field. Population is fast flowing into the State; its valleys and prairies are all passing into the possession of the best class of farmers from the North and East, whose better mode of tillage and better taste in improvements will soon wipe away all the relics of the careless and thriftless past; and the Missouri of to-day, agriculturally and prospectively, is twenty years ahead of the Missouri of six years ago. Improvements, whichever way one turns, meet the eye. Farms are improving, towns are improving, the condition of the people, both in a pecuniary and social aspect, is improving; schools are being built up and fostered, churches raise their spires toward heaven wherever a few can gather together in His name; roads are being made passable; in brief, everywhere where this new life has found location, all the elements that mark an advanced state of community are at work. All *except* the introduction of manufactures. These, with unaccountable sluggishness, lag behind, leaving Missouri in a great measure dependent upon the enterprise and labor of those who have already discovered and are acting upon the fact that the work of the shops adds more largely per head thus employed to the prosperity of all classes in community than any other. The secret of public wealth lies not in the amount *bought* and sold, whether of merchandise or of machinery, but in the amount *manufactured* and sold—in the increased value thus put upon the raw material. A town composed of dealers in manufactured articles and merchandise from abroad may be a convenience to the surrounding community, in the absence of establishments for the manufacture of the articles; but it is in sober reality nothing but a drain upon the country, because it adds nothing to the value of the raw materials that the region produces. These are facts in political economy that others have learned. Why should not Missouri profit by the lesson? She will some day, but the postponement of that time is a serious mistake. In this, as in another matter, "now is the day and now the accepted time." Every year of delay sends out of the State millions of dollars to pay for the labor and material involved in the articles thus purchased, and defrauds the agricultural community and others of other millions which they would realize from the increased value of real estate and the improvement of local markets. Against this we plead as against a blunder in political economy that should exist no longer than is necessary for its correction.

Considering the disabilities under which Missouri labored prior to the introduction of the free labor system, her progress in manufacturing and the mechanic arts was not a discouraging one. Capital and skill both stood aloof while slavery existed. The State was deprived of her fair proportion of the emigration which poured out of New England and the other older States, seeking homes in the fairer and richer fields of the West. Labor, neither agricultural nor mechanical, met with the respect to which it had been accustomed in the East and North ; hence it left Missouri to the tender mercies of the thriftless and non-enterprising characteristics of the immigrant from the South. Population increased slowly, but improvements increased yet more slowly. And yet, under all these discouraging circumstances the census shows that in 1860, with a population of 1,182,012, she had of various kinds two thousand eight hundred and five manufacturing establishments, with a capital of $20,500,000, using raw material valued at $24,000,000, giving employment to 21,330 hands, males and females, and turning out products valued at $43,000,000—an increase in products in ten years of $19,175,582. Deducting from the sum total of forty-three millions and a half the value of flour and meal, $8,997,083, lumber, $3,704,990, and gas, $419,306, we have left about thirty millions as the value of what may more strictly be called the products of the mechanic arts, including $868,768 for boots and shoes, $1,041,520 for castings, $719,500 for steam engines, $525,319 for woolen goods, $230,000 for cotton goods, $280,037 for agricultural implements, $208,142 for furniture, and $368,826 for leather.

Since 1860, or rather since the close of the war of the rebellion, a new era has dawned upon the State. The currents of immigration have strongly set in upon her. The North and the East are contributing largely of their best agriculturists; capitalists do not hesitate to join their fortunes with us, and the next census will place Missouri not lower than the fifth in the Union in point of population. Within the past two years a reasonable start has been made in manufacturing, but it is altogether too confined in its scope and too limited in its field of operation. Missouri has to-day the capital and the population to justify her in entering the field in competition with those who now reap the profits of her trade.

An able writer on industrial statistics, in contending with the irresistible force of truth that, in point of productive value and far-reaching industrial influences alone, manufactures are entitled to a front rank among the great interests of the country, forcibly remarks that "the mechanic arts—particularly in our own country, where they are most diffused and all but universal—appear to contribute more directly than any other to the general comfort and improvement of the people. *All others are dependent upon them for the principal agents and instruments ot their success.* They are scarcely more subservient to the primary wants of mankind than to the higher ministrations of taste and refinement. The acquisition and diffusion of knowledge, the means of intercommunication and transportation, the comforts and enjoyments and security of the fireside, and even the honor and integrity of the nation itself, are dependent upon the skill and enterprise of the manufacturer and the mechanician; but the results of their labors are, from their nature, less obtrusive or obvious to the general apprehension than some others. The increased support given to agriculture, commerce, and the mining interests, by the consumption of hundreds of millions of dollars' worth of raw material, and to hundreds of thousands of men, women, and children, who would have been otherwise unemployed or forced into competition with the farmer and planter, instead of being consumers of their produce, form but a part of the benefits conferred upon the community at large. The independence and security contributed by the large body of intelligent manufacturers and mechanics capable of ministering to every want, whether of supply or defense, cannot be overestimated. Nor has this department of American industry been cultivated at the expense of any other. There is much reason to believe that it *affords the safest guarantee of the permanency and success of every other branch.* Evidence bearing upon this point is found in the manufacture of agricultural machines and implements. There is little doubt that the province of manufactures and invention in this case has been rather to create than to follow the demand. The promptness of Americans to adopt labor-saving appliances, and the vast areas devoted to grain and other staples in the United States, have developed the mechanics of agriculture to an extent and perfection elsewhere unequaled. The adoption of machinery to the extent now common in farm and plantation labor furnishes the best assurance that the development of agriculture or manufactures to their utmost can never again justify the old charge of antagonism between them in regard to labor, or injuriously affect either by materially modifying its cost or supply."

To show how helpless a great portion of Missouri is now, let us illustrate by some facts that came to our knowledge during the past summer. In a town of four thousand population, carrying now the mature age of over forty years on its shoulders, surrounded by as fine farming country as the West can show, and over two hundred miles from St. Louis, a gentleman called at an agricultural implement store for a hoe-handle. The merchant had none, but informed his customer that if he would wait a few days he would send to St. Louis for some! And he did so, getting one dozen, which were all taken by the one customer. This fact coming to the writer's knowledge induced him to call at the store, where he found not an article manufactured in the town, but grain drills and cultivators from Ohio, reapers from the same State, all other agricultural machinery that chanced to be on hand from like distances, and wooden rakes from St. Louis. When asked why this was so, and why the interests of the town as well as the farming community were not advanced by the establishment of a manufactory which, while it turned out all these at less cost than they could be transported such long distances, would at the same time largely increase the population and wealth of the town, and as a direct consequence enhance the value of farms and improve the market for farm products, the answer was that it would cost too much to freight the iron. Cost too much to freight the iron! Why, were not the farmers who bought these imported wares paying freight not only upon the iron that was in them, but upon the wood also—upon material that was growing all around them, and could be had without cost of freight? Extending the inquiry, it was found that throughout a range of a score of counties, including the best broom corn land that can by any possibility be found, all brooms and brushes were freighted through from the Mississippi at a cost of about three dollars per hundred weight. And such was found to be the case with regard to furniture, down even to the most common chair.

Now, take this town as an illustration of what might be, and the consequences thereof. Let us first state the premises. A town of about four thousand, a fine farming country, reasonably well improved, around it the best of the farms now selling for twenty dollars per acre, and only at this rate with the hope of a railroad sometime in the future. Locate there an establishment for the manufacture of agricultural machinery and implements, say with a capital of $100,000. This would give employment to at least 75 persons, 50 of whom would have families, averaging five members each—275 mouths to be fed and bodies to be clothed. Build up a chair and furniture shop, with a capital of $50,000, employing not less than 30 hands, half of them with families—90 more to be fed and clothed. Look no longer to the East for brooms, but make the surrounding twenty-five or thirty counties subservient to that nearer point for their supply, say an establishment with 25 hands, one-half with families—72 more to be fed and clothed. Add to these the employers, probably not less than three to each establishment, and their families, and 45 more may be carried to the sum total.

Here are near 500, or, to be precise, 482, of population added to the community at once; that number to be fed and clothed, and at a low estimate $100,000 per annum for these purposes alone would be spent in town and country by this increased number. Then add to this the vastly larger amount scattered over the surrounding region for oak and walnut and pine lumber, for broom corn, and for other materials constantly in demand, and some idea may be formed of their importance. The town increases in population, the country for a large circle feels the effects of the increased business and new markets thus created, and the value of farms increases in a more than corresponding ratio, and the $200,000 to start these establishments goes back to the community by these enhancements in perhaps a single year. But the effect does not stop here. One brisk establishment creates the necessity for others, and thus the improvement goes on, all classes in community, in both town and country, reaping a portion of the reward.

Admit, if such is the demand, that the farmer and other members of community do not get these articles, thus manufactured at their door, at one cent less than they did when the wood and iron in a manufactured state were imported to them at a heavy cost for freight, the articles are still cheaper to them by just so much as their other interests have been enhanced by the increased value put upon them by having these manufactories located in their midst, and by the creation of a better home market for their crops. Will any one deny this? And will any one who has had the opportunity to note the influence of manufacturing establishments deny that the result is precisely as here stated?

Thus it will be seen that a community of ordinary wealth, and properly located as to the district of country surrounding it, can afford to advance, yea, even to *give*, the capital necessary for the establishment of manufactures in its midst, and that no investment would pay better than such a gift. But there is one thing that must be borne in mind all the time: enterprise, business enterprise and tact, are absolutely necessary to success in any such movement. A woolen mill, an implement factory, a broom factory—indeed, nothing that we know of in that line, will run itself. Woolen mills in the country have failed, not because the material and the labor could not be economized there as well as elsewhere, but because the requirements of the market were not met; because their managers, perhaps, understood their business *in* the mills, but knew nothing about that necessary branch of it *out* of the mills, and away from the sound of the spindles.

Aside from supplying her own citizens with home manufactures, with all the attendant advantages, may be considered the question of the peculiarly favorable position of Missouri as the great manufacturer for, and distributer to, the country that lies west and southwest. See how nature has put her mark upon the State for this office. Within her borders is an exhaustless supply of all the materials necessary for the work—oaks and other woods of the best quality; iron and other metals; coal for her furnaces, and water power so affluent that it is almost a marvel. Her rivers and her railroads do now, or will in the immediate future, give her direct access to all the wide range of country that stretches from her borders to the shadows of the Rocky mountains—a range that will be populated wherever the sound of the engine whistle is heard, and must be supplied from factories and shops this side of that region; for, while nature has been lavish in some of her gifts to it, she has entirely withheld the elements that mark a manufacturing country. Will not Missouri make ready to do something more for this immense region than simply to send out the merchandise she has purchased elsewhere? Will it be the part of wisdom to let others reap the lion's share in this trade, while she, with all the opportunity that nature has given her, contents herself with the beggarly penny of the trafficker—and that pittance going only into the pocket of the merchant—while the State at large, the farmer, the mechanic, the owner of the unused material, gains nothing by the traffic? If the people of Missouri would enrich themselves by this trade, now is the time to put some of their surplus capital into manufacturing companies, and be prepared to secure the whole legitimate profits arising therefrom. Mills and factories and shops, for manufacturing paper, leather, railroad iron, machinery of all kinds, woodwork of all descriptions, boots and shoes, woolens, plows, grain drills, cultivators, reapers and mowers, threshing machines, furniture, and an infinite number of other articles, should enrich communities in Missouri, while they turn out fabrics for that western trade.

Then look at the field that Missouri has in the Southwest, which the next decade will develop and make ready for her works if she is then ready to supply them. When the difficulties that now unfortunately surround a portion of the country are settled, Arkansas and Texas, especially Middle and Northern Texas, will fill up with a thriving, enterprising people, who will know how to make and how wisely to spend money. Must they look elsewhere than to the one who should be naturally their supplier? That the supply must come from somewhere other than from their own workshops and factories is reasonably sure, as nature itself appears to resolve against successful shopwork throughout the regions south of us. And if Missouri furnishes these supplies, shall she do it only as a distributer, leaving elsewhere the profits of manufacturing, and leaving her own raw material untouched? Shall she, in other words, pay Massachusetts ten dollars for an article to sell again at twelve, thus simply putting into the pocket of the merchant two dollars, while the citizens of Massachusetts have received five dollars of the ten for the labor and material? Or rather shall she not use her own material and labor, and thus save to herself, distributed to her own citizens, both the cost and the profit?

Speaking of Massachusetts, let us look for a moment at what that little State, with her small population, accomplishes within a year. For the figures following we go to the census of 1860, as they will illustrate the facts we desire to impress upon the public as well as later returns. With an area of 7,800 square miles, and a population of 1,231,066, she produced, during the year ending June 1, 1860:

Agricultural implements	worth	$1,740,943
Pig iron	"	403,000
Bar and other rolled iron	"	1,291,200
Steam engines and machinery	"	5,131,238
Iron castings	"	1,801,035
Books, etc.	"	2,905,916
Sewing machines	"	1,067,300
Clothing	"	6,440,671
Lumber, sawed and planed	"	2,288,419
Distilled spirits	"	1,266,570
Malt liquors	"	658,700
Cotton goods	"	36,745,864
Woolen goods	"	18,930,000
Leather	"	10,354,056
Boots and shoes	"	46,440,209
India rubber goods	"	803,000
Furniture	"	3,365,415
Musical instruments	"	1,762,470
Jewelry, etc.	"	2,648,641
Soap and candles	"	1,910,206

Here is a list representing about one hundred and fifty millions of dollars, and yet it does not include such important branches of manufacture as paper, brass and tinwork, strawgoods, woodenwares, other than furniture, ship building, and many others of greater or less importance; the whole, named and unnamed branches, presenting a product estimated at $266,000,000, and using raw material valued at $141,000,000—the remaining $125,000,000 representing the amount paid for labor and the profits of the manufacturers. Of course, to build up this immense interest has required the persistent labors of many years, involved large amounts of capital, and now, to keep it in the high road of success, receives the attention of the most thoroughly ripened experience; but in this connection there is one fact to be considered, viz., when Massachusetts began the career that has made her, in proportion to area and population, the wealthiest as well as the most powerful State in the Union, nearly all the machinery and the processes of manufacture were in a crude state, and she had to work through this step by step, her inventors and scientific men meeting each emergency as it arose. Those who now follow after her have the advantage of this experience and these improvements, and they start in the race at the point where Massachusetts stands to-day.

Missouri, in one respect, will never be a second Massachusetts. She may be, and ought to be, in the sum total of her manufactures—but she will combine the two elements of agriculture and manufacturing. Her soil and climate will always keep up the important interests of grain and wool growing and stock raising. In this respect she will have the advantage of her competitors in the East. To feed their operatives they are dependent on the rich fields of the West; while here, in Missouri, even half a million of workmen in mills and factories would not only not exhaust our surplus food, but would add to the value of our home markets, and increase immensely the value of the lands from which were drawn the supplies.

To come down to communities: the influence upon both town and country, exerted by the establishment of manufactures, may be clearly seen by reference to various localities in New York, Ohio, and elsewhere. Take Ilion, in the former State, which, before the building up of the Remington works, a few years since, scarcely had an existence. To-day, its inhabitants will number over ten thousand, and the country around it has progressed, consequently, with an impetus that has made the investment in farm lands a valuable one—simply for increase, exclusive of the use. So with Auburn and its surroundings, where, inside of ten years, has sprung up a very large business in the manufacture of harvesters and other agricultural machinery. When this commenced, Auburn was simply a handsome town with a State prison; now it is a city of many thousands, and its machine shops and factories are paying out annually for labor and material many hundreds of thousands of dollars, a full proportion of which find their way into the pockets of the agricultural community. So with several other localities in that State.

Coming west, in Ohio will be found many localities where the investment of a few hundred thousand dollars has brought back profits, in the shape of increased value of farms and town property, more than tenfold. That State was the western pioneer in the manufacture of reapers, mowers, threshers, and other agricultural machinery, and her representatives in these articles may be found all over the West. The growing important centers in the State are the towns where this work is done, and the country around them has kept pace with the town in improvements and value. The machine shops and agricultural machine factories of Alliance, Canton, and Massillon have doubled the average of the whole of Stark county; while those of Akron, Salem, Springfield, Hamilton, and other places, have had a like influence.

Not one of these towns, in any respect, either of location, procuring the raw material, or facilities for placing the manufactured products in the market, has a single advantage over many localities in Missouri that might be named—not an advantage in any shape, except, perhaps, in the possession of men who saw that there was money to be made in manufacturing, and a population that encouraged by their counsel and their means the starting of these enterprises. And the communities that have fostered and encouraged these establishments are growing every year more wealthy upon the money that the manufacturers draw from abroad, from Missouri as well as elsewhere, for their wares, and take it to New York and Ohio and pay to their laborers for the raw material and for the many items of expenditure attendant upon the manufacturing.

Before closing this paper, we wish specially to commend to the attention of the editors in Missouri this subject of home manufactures, and ask them to urge upon those who have capital for investment to invest it in this neglected field. The press is indeed a power—a "third estate" in the realm—and when it moves for the accomplishment of an object, it never moves in vain. To its pleadings we owe the successful issue of many projects for railroads and other public improvements; and if now it will ply the community with facts and figures upon this subject, it will not be long before a score of towns in Missouri will begin to throb with the life that manufacturing establishments will infuse into their veins—not long before the clang of the hammer and the whirr of the wheel will be furnishing the music to which the State shall march to wealth and power.—WM. B. FAIRCHILD.

PAINTS AND CLAYS.

BY G. C. BROADHEAD.

As yet the State of Missouri has contributed to the public use but a small proportion of paint and pottery clays—not because they do not exist, but because they have been imperfectly developed or their existence not told.

In the igneous regions of Southeast Missouri are found beds of clay which may be *kablin*, or beds of other clays, valuable for painting.

In Iron county, at the head of Carver's creek, is an eight-foot bed of reddish porphyritic clay, and a few miles east on Big creek is a bed of white clay.

In Madison county, in section two, township thirty-three, range six, east, is a regular three-foot bed of what seemed to be black oxid of manganese; similar specimens have been seen as coming from Shannon county. There is a bed of red ochreous oxid e of iron on Bear creek, in Wayne county, which has been used to paint houses. A bed of material similar to that last named is found in Pike county, one mile east and one mile south of Spencersburg; at this place it is five feet in thickness; another similar bed in the same county, in section three, township fifty-two, range two, west. The adjacent clay is quite red.

In the western part of St. Charles county, on Callaway fork, near the county line, red clays and beds of red shale, or keel, are found in the Chemung rock. Near the road, one-half mile east of Pauldingville, in the lower brown beds of encrinital limestone, there is interstratified much red ochreous oxide of iron.

On Tuque creek, in Warren county, the clay soil is very red. Near Ritter's store is a red clay bed; also, one on Lost creek. These probably result from decomposition of portions of the Black river limestone group. In section twenty-five, township forty-six, range three, west, is a seven-foot bed of red clay. A bed of red clay, suitable for painting, is found a few miles south of Wright City; thick beds of drab, purple, and variegated clay are found at the head of Lost creek, and on Camp creek, a few miles north of the railroad.

In St. Charles county, on Boonslick road, at the "Old Logan" place, an exposure fifteen feet thick by one hundred feet along the branch is seen of various colored clays—purple, bluish, drab, and variegated —smooth to the touch, and breaking, on exposure, with a conchoidal fracture, into small nodules. I have seen a specimen of pale purple painted with oil and this clay.

In Osage county, in section seventeen, township forty-one, range eleven, west, is a bed of red ferruginous clay, containing quartz of crystals, together with oxide of iron and sulphuret of zinc. At the head of Bailey's creek are several beds of reddish ferruginous clays.

The above are in part from unpublished notes of the geological survey. It is much to be regretted that the many very important items noted down by those who made the survey are yet unpublished. Future analysis may determine many important facts yet unknown pertaining to the mineral wealth of Missouri.

CAVES IN MISSOURI.

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Kentucky has her Mammoth Cave; Virginia her Weyers; and although Missouri has no such large and noted caves, still many are worthy of note; and it is only because they have been imperfectly explored that many large ones are as yet scarcely known beyond their immediate vicinity.

The following is a brief description of the principal caves in Missouri:

CONNER'S CAVE, IN BOONE COUNTY,

eight miles northwest of Columbia, is said to have been explored eight miles. It occurs in encrinital limestone, and contains many stalactites.

FRIED'S CAVE, IN MARIES COUNTY.

This occurs about six miles north of the Southwest Branch of the Pacific railroad, near Cane Spring creek, a tributary of Gasconade river. It is said to have been explored for several miles. I examined it for several hundred yards, observing some large apartments. One apartment was quite beautiful, and contained many stalactites and stalagmites. Many bats inhabit this cave. A pure, clear and cold stream of water issues from it, along whose bed are found many small mollusks. The cave is in third magnesian limestone, and the surrounding hills are high and broken.

CAVE ON SAC RIVER, GREENE COUNTY.

To this there are two entrances, one at the bottom of the hill, forty-five feet high and eighty feet wide; another one hundred and fifty feet back, and opening on the hilltop. Entering at the latter we passed eastward through a chamber twenty feet in hight, thence over stalagmites for about a hundred yards. The roof then becoming low, we had to stoop for about thirty yards; next, turning to the left, entered a spacious chamber, from twenty to twenty-five feet in hight, and, as we passed along its corridors, were attracted by many objects of beauty on either side—stalactites as white as snow, some resembling icicles, others folding over gracefully and wave-like, with beautiful serrated edges. We next came to where the stalactites and stalagmites uniting form solid columns of support, and assume various and grotesque forms. At one place I fancied that I saw a beautiful statue of the Madonna and babe.

This cave is in the lower encrinital limestone. I had not time to make an entire exploration; so, retracing our steps, we passed out at the lower entrance.

CAVES NEAR OZARK, IN CHRISTIAN COUNTY.

Up Finley creek, a few miles from Ozark, a stream enters a sink-hole, passes under ground, and appears again three-quarters of a mile southeast, through an opening sixty feet by ninety-eight feet wide. Up stream, the cave continues this size for about one hundred yards, when it rapidly decreases to ten feet high and fourteen feet wide. Passed in, for about a quarter of a mile, the cave varying in width; some beautiful stalactites and stalagmites were observed. The water is very clear, and in it I found a cray fish without eyes. The aperture is very low where the stream enters the ground, but widens within. The overlying rock is encrinital limestone. There is another large cave a few miles south of Ozark, and one about ten miles southeast.

"DEVIL'S BOOT," IN WARREN COUNTY.

This cave is near Marthasville, and is in saccharoidal sandstone. The opening is on the top of the ground, is nearly circular, and about twenty-five feet in diameter. The descent is perpendicular, and about thirty feet to the floor; thence one hundred and fifty feet in a horizontal direction to the further end, being eight feet high in the middle near the entrance, and increasing to about sixty feet wide and twenty-five feet high at the further end. The surrounding sandstone is whitish. There are a few pretty stalactites and stalagmites. On the floor is a stiff, green clay, traversed by streaks of black sand. Chert is intercalated with the latter.

In the hills, on the headwaters of the "Dry Fork of Charette," two miles back of Ritter's store, Warren county, visited a cave in saccharoidal sandstone. The entrance is on the north side of a hill; thence southwardly, winding around northeast, and descending over tumbling masses of sandstone for about sixty feet; passed through small chamber into a large one. Much of the sandstone is beautifully ripple-marked, giving the roof, in many places for ten feet square, a beautifully waved appearance. The cave is occupied by many bats.

PIKE COUNTY.

On the south side of Salt river, near Matson's mill, are many sink-holes. Entering one of these, found a crevice extending southwest for about thirty feet; in this I collected some fine specimens of amber-colored arragonite. Was stopped by a perpendicular descent of unknown depth, probably not very great, down which I could see for about thirty feet. Letting fall my candle into the abyss, I observed a portion of the wall of a snowy whiteness, probably stalactitic. This cave is in the middle Trenton limestone.

RALLS COUNTY.

Visited a cave at J. P. Fisher's, about two hundred yards from Spencer's creek, below the crossing of the New London and Louisiana road. At the entrance it is ninety feet wide by twenty feet high. The upper rock is gray cavernous Trenton limestone, is thirty-two feet thick from top-bed to the floor of cave. The lower Trenton occupies the floor. A distance of one hundred and fifty yards back from the entrance is a sink-hole communicating with the interior of the cave. There is a clear, cool spring within, and Mr. F. informed me that mutton could be kept fresh here for six weeks during midsummer.

M'DOWELL'S CAVE,

About two miles below Hannibal, and about half a mile from the Mississippi river, is principally noted for being the place where Dr. McDowell deposited for a while the corpse of a relative to see if it would petrify. The entrance is from the north. I passed in one hundred and fifty feet along an avenue crossed by four or five others at nearly right angles; they are high enough for one to walk along with ease, and are from two to four feet wide, varying to double that width. The surrounding rock is lithographic limestone.

In the northern part of Lincoln county, near Cuivre river, are several tolerably large caves. The beds of Trenton limestone are very cavernous. On Sulphur fork of Cuivre is a cave and natural bridge, which has been much resorted to by parties of pleasure. The scenery here is wild; the bluff is sixty-one feet high, including seventeen feet hight within the bridge, and nineteen feet above. The bridge or cavern is tubular, with twenty feet between the walls, and one hundred feet long; direction, northwest and southeast, thirty-eight feet from the bottom; another passage diverges southward.

Another quite interesting natural bridge is that over Clifty creek, in Maries county; it has thirty feet span, fifteen feet elevation, fifteen feet width, and twelve feet thickness, and is in third magnesian limestone, with surrounding scenery wild and picturesque.

Besides the caves above named might be mentioned many others of smaller size, some possessing some beauty, and others that have been turned to a useful purpose by the farmer, miner, brewer, or wine merchant. During the summer the farmer keeps his meat or butter fresh and sweet within the cave; and beneath the overhanging ledges the sheep are secure from the cold blasts of winter. In many caves the clay is said to possess the properties of saltpeter, viz: at Saltpeter cave, on Mississippi bluffs, near Gwinn's creek, Pike county; on Cuivre, near Louisville, Lincoln county; cave in saccharoidal sandstone, near Portland, Callaway county (at which place are remains of saltpeter works); Fried's cave, and at caves on Gasconade river, in Pulaski county.

In some geological formations caves are abundant, in others are very rare, or else not found at all. The encrinital limestone, Trenton limestone, saccharoidal sandstone, and third magnesian limestone abound in them.

In no case has the formation of caves been traced to any violent eruptive or igneous force. Sink-holes generally communicate with them. Their origin seems to be in the breaking apart, subsequent removal of masses and fragments of stone, and the abrasion of water—the latter applying principally to standstone caves. G. C. B.

AGRICULTURAL EDUCATION.

Address of Professor G. C. Swallow, delivered before the State Board of Agriculture, in the House of Representatives, at Jefferson City, January 29, 1868.

MR. PRESIDENT AND MEMBERS OF THE GENERAL ASSEMBLY:

We all admit that there *is an education* suited to the wants of those entering upon the duties of the learned professions; that no one can expect to attain unto the highest success as a physician, a lawyer or as a preacher, unless he has first received a thorough training in the course of studies prescribed for his particular profession. But some doubt whether there be any education peculiarly adapted to and necessary for the highest degree of excellence in agricultural and mechanical pursuits; and they do not feel the necessity of establishing industrial schools.

As we are now called upon to decide a question which will give the youth of Missouri, for generations to come, a school where they can be trained for the highest excellence in mechanical and agricultural pursuits, or which will deprive them of those advantages for many years to come, it is a matter of great moment to decide wisely.

Were some question to be decided of equal importance to either of the learned professions, or even to the merchants or bankers of the State, as is this question of the industrial college to the farmers and mechanics, you would see such an ingathering about these halls as would secure a full appreciation of the whole subject matter.

We come, as in duty bound by the law creating the State Board of Agriculture, to ask at your hands a patient examination of the whole question, and the adoption of such legislation as will secure to our youth the best possible education to fit them for the farm and workshop. A liberal education has generally taken them to the learned professions; but we wish to give them a liberal education that will increase their love for the industrial pursuits.

The prejudice somewhat prevalent against "book farming," or "scientific farming," arises in part, doubtless, from the fact that some who farm on scientific principles do not always succeed. But this argument is equally strong against those who pursue the "good old way," as they do not always succeed. It would also apply against all learning, as educated men are often less successful. And besides, many who pretend to farm on scientific principles are mere pretenders, who know nothing of science. No one doubts that experience is valuable to the farmer; and science is made up of principles derived from the experience of all who have lived before us—*science is the essence of all experience.* The science of agriculture is derived from the experience of all farmers from Adam to the present time.

All of us know some of these scientific principles, and others we do not know. We know how to make our gardens yield fruit seven months in the year; but all do not know how the gardens of Alcinous were made to yield fruit *twelve* months in the year.

Washington, who was a *book farmer*, raised better crops than his neighbors; and Lavoisier, a distinguished French savan, doubled the crops of his domain, and quadrupled his profits, by *scientific farming.* Would it not benefit our young farmers to know how these results were obtained? And this is part of what an agricultural college will teach. But this not enough; we want to know more than the results and how they were obtained.

It is a well-known fact that salt has greatly increased crops of wheat; but this fact, without knowing why it is useful, might be even worse than useless to the farmer, as an application of it would in some places prove absolutely injurious. Hence, to render this fact really useful, we must know the composition and food of the wheat plant; how much salt it wants, the composition and structure of the soil; whether it contains salt enough, the location of the soil, the nature of prevailing winds—whether, as in many places, they will convey any salt to the crop. These investigations require a whole range of scientific knowledge—geology and chemistry to understand the soil, vegetable physiology and chemistry for the wheat, and geography and meteorology to determine the effects of the atmosphere and winds.

This fully illustrates the necessity of knowing the whole range of agricultural science, that we may successfully use the facts derived from the experience of others.

Horses are sometimes relieved from severe illness by bleeding; hence some use the lancet whenever the horse shows symptoms of disease, often to the great injury of this noble animal. Therefore it is important to know the physiology of the horse, to understand his diseases and the best remedies for each.

The improved breeds of horses, cattle, sheep, swine, and fowls have been produced by a long and careful investigation of the physical natures of these animals, the food best adapted to their natures, and the crosses calculated to produce any desired results. If these principles are unknown or neglected, the blooded horse will degenerate into the hack, the shepherd's dog into the useless cur, and the Durham into the scrub. All these invaluable principles are fully set forth in the science of *animal physiology*, taught in agricultural schools. In France there are several schools devoted exclusively to educating men for rearing and training horses. It is by these principles, this science, that the wolf, or wild dog, has been converted into the greyhound and the noble New Foundland.

The principles of vegetable physiology are no less important to the farmer. By them our rich cereals have been produced from wild grasses and grains, our delicious apples from the bitter crab, the luscious peach from the dry, wild almond; the tame grape from the wild, and the potato from a dry, poisonous wild root. And by the same principles of science these products of the farm and the orchard are being constantly improved. These wonderful results of vegetable science the ancients attributed to divine powers, under the name of Pan, Ceres, and Pomona.

But those who may study vegetable physiology in our industrial college, will find their science more propitious than the smiles of the whole catalogue of rural deities.

Scarcely any subject should demand the more serious consideration of the citizen and the State than the exhaustion of the soil. The soil is by far the most valuable of all our possessions. By proper care it may be indefinitely increased in productiveness and value; but, by bad husbandry, it will be gradually exhausted, and finally become a barren waste. Some of the most fruitful regions of the globe have become barren deserts, and a few wild animals now occupy the places where populous nations once dwelt.

Some say this desolation is the result of the curse of God for national sins. If so, I will venture the assertion that their greatest sin was the improvident destruction of forests, and the exhaustive cultivation of soils; as, without these acts, the desolation would have been impossible by the ordinary course of events. Let us be warned by the fate of Babylonia and other Eastern nations, by the exhausted regions in our own country, yea, and by exhausted fields in our own new and fertile State. He who exhausts his soil, wastes the birthright of his children and undermines the power and prosperity of the State. The State, therefore, should see to it that our forests be preserved, and our soils guarded against deterioration. No power but the knowledge of agricultural science can do this.

Let our farmers know the fertilizing ingredients of soils, and what each crop removes and how it may be restored; and above all, let them fully understand the great wrong and fatal consequences of the exhausting process, and they will soon adopt improved modes of culture. Let them know that one crop of tobacco takes from the soil as much as one hundred crops of hemp; that tobacco has well nigh ruined the fertility of large areas in the older states, and it will become a less popular staple. Let them fully appreciate that a crop of clover will restore to the soil all the fertilizing ingredients removed by a crop of wheat, and clover will more frequently occupy our fields. Let them know of the vast beds of marl beneath large areas of our soils to keep up their productive energies, and they will soon run the subsoil plow deep enough to bring up its rich ingredients and mingle them with the soil.

Let our agricultural college make known these and a hundred other means of promoting the fertility of our lands, and we shall have the best possible guarantee against this great calamity of exhausted soils and depopulated States.

If our industrial college should do this and nothing more, it will have repaid the State a thousand fold for the most munificent endowment, and for the most anxious care of every statesman and private citizen.

Such are a few hints of the vast storehouse of useful knowledge which an agricultural school would impress upon its pupils. Instead of there being any lack of materials useful to a student of agriculture, the difficulty will be to select a portion small enough to enable the student to master it in the time allotted to the college course.

It is a time-honored maxim that the youth should study what the man is to practice. The whole business of the farmer may be expressed in two words—*aid nature*—make two blades of grass grow where but one grew before. Cultivate the crab apple into the pippin, transform the mountain sheep into the South-Down, and the snarling wolf into the shepherd dog. Such are the ennobling duties of the farmer; his labors are with nature, and his success must depend upon their accordance with nature, or the laws of natural science. Farmers, then, above all men, need a thorough knowledge of *true philosophy* and *natural science.* Let those, therefore, who would be farmers, and would excel in the profession, study the natural sciences, especially those departments that lie at the foundations of practical agriculture.

When Augustus Cesar returned to imperial Rome from the wars which established the empire, he wished to call his veteran soldiers and the people back to their traditional love of agriculture. Land was distributed to the war-worn soldiers, and Virgil was employed to teach them the science and the beauties and glories of rural pursuits.

Those grand old poetical lectures were the theme of every shepherd and herdsman, and the burden of the vine-dresser's song. They inspired new confidence, new love, and new zeal in every department of agriculture.

I would that some master pen or tongue would call us back to our former love of the farm and country life; that our youth of country, village, and city could see a sparkling naiad in every stream and fountain, and a dryad in every tree of forest and copse; that Ceres might lead them to our broad prairies, and Pomona, with her luscious fruit, allure them to the Arcadian valleys and glorious hills of our Ozark highlands; that our maidens, with sparkling eye and glowing cheek, might follow Flora to the blooming fields and Diana to the hills and mountain glades, until the simplicity and beauty and happiness of Eden be restored to all our borders.

In the city is an everlasting struggle between fashion and stable habits; extravagance and penury; integrity and a necessity for money; between blooming chastity and ardent manhood. Amid the luxuries and vitiated atmospheres of cities, health is undermined and the physical powers degenerate; and the constant occurrence of exciting topics and thrilling incidents to excite, and great crises to overtax the intellect, is most detrimental to that equilibrium of powers most desirable in intellectual development.

Hence it happens that no city has within itself the power recuperative to keep up its own financial, physical, and political status.

It is the constant supply of manly men and blooming women from the mountains and valleys and forests and prairies of the country that populates the cities, and constantly infuses new vitality and energy into every department of those hotbeds of civilization.

Nations have been prosperous and stable while the rural populations have prevailed, but they have decayed when metropolitan manners and habits have become dominant.

It is the higher culture of those engaged in metropolitan pursuits, and the consequent facility they possess to become distinguished and obtain public positions, which draw the best talent of the country to the cities. Give us an equal culture for the farmer and the mechanic, and thus open to him equal chances for success and distinction, and let that culture portray the superior pleasures of rural pursuits, and you will have the best possible means of keeping up the proper equilibrium of country and city populations.

Make your industrial college what it should be—a living, ever-multiplying power, to make the country prosperous and happy, and able to compete with the cities for the best talent of the land.

I have thus intimated that there are valuable stores of science, greatly useful to those engaged in industrial pursuits, and that we need some new influences to keep up the proper balance of powers between our rural and metropolitan populations.

What can better diffuse these principles of the industrial sciences than an industrial college? What better to impress our youth with a love of country life than a college whose chairs are filled with men of sound science, in love with the farm and full of living, active powers? Such men will attract pupils, and such men will leave their impress upon the minds they educate.

That we need such a school, and that it should be established at once, has been declared by the people in the most positive and decided terms. For twenty years the newspapers of the State have teemed with facts and arguments to prove its importance; every report and book published upon our resources have proved its utility; and the farmers and mechanics of the State have spoken in the most positive terms, and made these legislative halls eloquent with their memorials for schools suited to their wants.

In 1852, to go back no further, the farmers and mechanics of Boone issued an address to the State and memorial to our legislators. Let me read what they said in 1852:

"FELLOW CITIZENS: To you, who have with us a common interest in all that can promote our success and secure the prosperity of our professions, we appeal for your sympathy, for your aid and co-operation, in our efforts to place the agricultural and mechanical arts of Missouri in that pre-eminence they so richly deserve. While the practical deductions of science have given a new impulse, infused new life and energy into almost every department of human industry, we are cultivating our farms as did our sires and grandsires before us. While progress is stamped upon everything, the farmer and the mechanic are plodding on 'in the good old way of our fathers.' The result is, we, in this land of mighty forests, are importing and paying three prices for our lumber. Our houses, plankroads, and fences cost twice their usual prices. We go east for our agricultural and mechanical implements of every grade, from the plow to the butter stamp. With iron mountains and inexhaustible coal beds, we import every article of iron, from the anvil to the ten-penny nail. While we are exhausting the virgin wealth of the richest soil the sun shines upon, our crops are no better than those harvested from the once barren hills of New England; and inferior races of stock crop our luxuriant prairies.

"The divine economy wisely provides that we shall eat our bread by the sweat of the brow; yet no divine or human wisdom demands that we shall toil and sweat and sweat and toil on from year to year, simply for the corn-cake and bacon our appetites demand. We believe we can do better—that we can become better farmers and better mechanics.

"In our effort, we ask the sympathy and aid of every profession. We do not ask others to labor for our benefit only, but for theirs also. We are the great heart of the body politic; if its pulsations are languid, the life blood will flow feebly in every department of human industry. We do not ask it as a favor, we demand it as a debt of long standing, one so just that all have frankly confessed the obligation whenever and wherever its claims have been presented.

" We have been freely taxed for the support of public schools, and have contributed liberally for the endowment of colleges and universities, for the education of physicians and clergymen, lawyers and gentlemen; and yet we look in vain for a school where the science of agriculture is practically taught.

"This we contend is wrong; and, as the guardians of our children's inheritance, as the lovers of our common country, we have resolved to do our duty in remedying the evil; that we, who have so freely aided others, will make one manly effort to aid ourselves."

These were the noble views of the farmers and mechanics of Boone sixteen years ago.

In the following winter, 1853, the farmers and mechanics of St. Louis county formed an agricultural and mechanical association. They reiterated the sentiment of their brethren of Boone, and declared their determination "To induce our State to provide a school, or an adjunct to some school, where our sons may be thoroughly and practically taught all those sciences which pertain to the agricultural and mechanical arts."

It may be said, we have good schools now. This is true; and it is doubtless true that the branches provided for are as well taught as their means will permit, and that they answer all the purposes of the learned professions. We wish them so educated that they can bring all the treasures of science to the improvement of the farm and the workshop.

Our sons can discourse learnedly upon the *feet* and *cæsuras* of the Greek hexameter, and sing " *Tityre tu patu*" with all the sweet elegance of a Virgil, but they have scarcely dreamed that fixed laws govern the developments of animal and vegetable structure. They are left in stupid ignorance of the glorious miracles of the organic world—the life-giving flow of the sap, and the development of leaf flower and fruit—the pulsations of the life-blood, and the telegraphic connection of the mind, nerve, and muscle. They can measure the hight of a lunar mountain and decompose the nebulæ of the milky way; yet their science would be at fault in removing a mole-hill, or in compounding a cement to pave a footpath.

In 1865 the State Agricultural and Mechanical Association, in a memorial to the Legislature, use these words:

"Your memorialists cannot better conclude the duties assigned them than by soliciting the favorable consideration by your honorable body of the following resolutions, and recommending immediate action thereon:

"*Resolved*, That the General Assembly of this State is respectfully requested to direct the State Geologist to give special attention to the agricultural interests of the State, to examine the mechanical and chemical properties of all soils and fertilizers, point out the several varieties of soils and the capacities and peculiar properties of each, together with the crops and culture and fertilizers adapted to them, respectively; and designate the trees and other plants which grow upon and characterize them, and lay down upon the map, so far as may be, the territory occupied by these several soils.

"*Resolved*, That, in our opinion, the office of State Geologist should be continued until the survey of the whole State is completed."

The signatures to the memorial are truly significant. W. B. Napton, of the supreme bench, gives it the stamp of sound judgment; John Locke Hardiman, now, alas! no more, one of the very best farmers of the country, and Claiborne Fox Jackson, a farmer and politician, as Benton said, "keen to catch the popular will."

In obedience to the undoubted will of the people thus expressed, a law was passed making it the duty of the State Geologist to carry out these wishes of the farmers of the State, and collect the soils and secure their analyses and the examination of all their physical properties. This has been done, and a large amount of material provided for the teachers of our agricultural college.

The farmers and mechanics of Buchanan county, and many others, also memorialized the law-makers of those days for an agricultural college. These farmers of the Northwest hold this significant language:

"It is believed that the introduction of a proper system of agricultural education will tend not only to the augmentation of material wealth, to an increase of the value of property, and to the preservation of our lands from exhaustion by imprudent husbandry, but also to foster the higher interests of society. As farmers constitute the chief bases of the moral strength of the community, and the main pillar of free republican government, it may in some degree be appreciated *how vast* and *general* in its reflex influence upon all classes would be the beneficial effect of a proper provision for their general improvement in mind and practice. and for the elevation of their pursuits from the low rank of a rude and traditional *art* to the dignity of an important and progressive *science*."

Who can doubt that such a school would make its graduates full peers of the learned professions in all useful and scholarly attainments?

In 1859, the faculty of the University petitioned the curators to establish in the University a school of scientific agriculture and mechanics. They use this language:

"No one can doubt that the young farmer may derive much benefit from the stores of wisdom and experience taught in scientific agriculture and the natural sciences. It must be as useful to him to understand the composition and structure of the soil as it would be to understand the size and form of the lunar mountains. And yet, there is not a school in Missouri that will give them the varied and valuable principles of *scientific agriculture.*

"The school proposed will supply this important hiatus in our system of education, and enable the young man, who cannot spare six years to pass through the regular course, to obtain the education most useful to him, and to graduate honorably in two or three years. And we believe that our young farmers have just as much claim upon the State for an education as the lawyers, physicians, and preachers have."

When the new constitution of the State was formed, this wish of the people, so often and so variously expressed, was crystalized in these noble words:

"Article IX., section 4. The General Assembly shall also establish and maintain a State university, with departments for instruction in teaching, in agriculture, and in natural science."

Nor has this feeling been confined to Missouri; it has pervaded all parts of the land. This demand for an education suited to the industrial classes became so potent that it secured the legislation which has given each State large tracts of land to endow an industrial college.

We boast of our superior advancement, but Europe is far ahead of us in establishing industrial schools. The rulers of Europe, who know their safety depends upon an abundance of food, have long since decided that agricultural schools are necessary to secure the largest possible production. The number and extent of industrial schools in the various countries are truly surprising; and new ones are established every year. Some of them equal the largest universities in the number of professors and other facilities, for training their numerous pupils.

England has several agricultural schools; one at Ealing was sustained by Lady Byron. Prince Albert had a model farm which he himself superintended.

Ireland had five agricultural colleges in 1850, and her board of education then decided to establish twenty-five others. All public school teachers are required to instruct their pupils in the principles of agriculture.

Prussia had five first-class agricultural schools—twenty-eight of an inferior grade, devoted to special subjects, as meadows, forests, horticulture, sheep, horses, etc., etc., seventy-two experimental farms, and numerous pomological gardens.

France had one hundred and thirty-two extensive agricultural schools, three hundred minor institutions, besides numerous experimental farms and gardens under public patronage. There is a fine school at Dijon, devoted to grape culture and wine-making. A monthly journal devoted to these subject is issued by this institution. There is scarcely a doubt that the pupils of this school have a more thorough and intelligent knowledge of the climate and soils, and the adaptations of our State to grape growing, than the pupils of our colleges. The facts collected on these subjects by our geological survey are used in the lectures of this school, and were published, with illustrations, in their *Wine Grower's Monthly*, the *Moniteur*, and other journals of the empire.

These facts were esteemed of so much importance to the people of France that more than 100,000 copies were there published and circulated, and yet our own legislators have steadily refused to publish a single copy for our people.

Russia and other European governments have made liberal provisions for industrial education.

It is said that, through the influence of these thousand schools and other causes, the products of Eastern Europe have been doubled during the last half century. And yet, there is not a single school in Missouri where our youth can obtain an industrial education.

Such a state of things is wrong. We contend that the natural sciences, those practical deductions of all the experience of preceding generations, can be so taught as to benefit our professions more than any others. Farmers and mechanics have lived as long, have had as much experience, and have made as many useful discoveries, as lawyers and physicians; and the results of their experience, embodied in the natural sciences, can be made as accessible to the pupil as the principles of law or medicine. The experience of Archimedes and Cincinnatus is as valuable to us as that of Lycurgus and Esculapius to those learned professions; Liebig and Cuvier have done as much for the agricultural and mechanical arts as Blackstone and Hunter for law and medicine.

We therefore ask for the adoption of such measures as will enable our sons to obtain a practical knowledge of all those sciences which pertain to agriculture, mechanics, and mining. We seek the adoption of no Utopian theory, no doubtful experiment. The matter has been tested, and the results have proven most beneficial to the heads and pockets of those interested. That scientific agriculture can make the desert bloom like a garden has been too often demonstrated by experiment to need support at this late day. Many an acre once barren, on the sandy shores of Maryland and Long Island, and among the stony hills of New England, annually yields its rich harvests, a golden tribute to science.

Shall we say, then, that Cesar, and Peter the Great, and Napoleon, and all the rulers of modern Europe, were deceived as to the utility of agricultural education? Why, then, are these nations still increasing their agricultural colleges? Shall we disregard the wishes and convictions of the farmers of our country, whose demands have secured this grant of land? Shall we not listen to the wishes of the farmers and mechanics of our own State, so often and so well expressed in speeches and memorials to our legislators? But the proof is conclusive that we need such a school, and that our people demand a liberal provision for an *industrial college.*

But who shall manage this college of agriculture and mechanics? We say put it into the hands of live men, who are in sympathy with the progress of the age, and who know the wants of the farm and the workshop. But above all things we want teachers in this school who know how to teach the practical as well as abstract science; and, to secure success, we must have one leading man at least from the workshop and farm, who will be in sympathy with, and who will know the wants of, the farmer and mechanic. And besides, he should have all the knowledge of science and art that would fully fit him for the high station.

He should know how to "speed the plow," and to unfold all the treasures of science. He should love the field and the forest, be at home in the orchard and in the vineyard, and have the *shiboleth* of the herdsman and the shepherd. Above all, he should be in sympathy with man's highest nature. His examples and teachings should be such as would lead our youth to the higher and nobler destinies of life. With such men to inspire our agricultural and mechanical college, we may expect for it a career of usefulness and brilliant successes such as no other school has achieved. And the man whose genius shall give this college a living power; whose learning shall fill it with all the attractions of heaven-born science; whose practical knowledge shall surround it with all that is useful to the toilers of the shop and the farm, and whose zeal and devotion shall inspire our youth with a love for the noble powers of the mechanic and the glorious pursuits of the farmer—that happy man shall stand pre-eminent among the benefactors of the State.

It shall be his mission to dispel the remnants of past prejudices against practical education. He is not to call us from the labors our natures demand, but to restore to those labors the pleasures that surrounded them in Eden. His instructions will bring his pupils into harmony with the laws of the physical universe, and thus relieve them from the burden and weariness of work, brought upon Adam and all his children by breaking the physical and the moral law. Then shall the husbandman control those powers in nature which the poets of antiquity made so potent and beautiful in the characters of Pan and Ceres, and the pleasures so bewitching in the fair nymphs and naiads.

As the genius of Jason killed the dragon that guarded the golden apples of the Hesperides, so shall the genius and science of our agricultural college destroy this prejudice against practical education, and open in still greater abundance the golden harvests of these Hesperian climes.

Our prairies of the North and West, as grand and beautiful as Campana, and as rich as the soils of the Nile, will soon be covered with a continuous succession of broad acres in rustling corn and waving grain, and vast herds of fat cattle shall crop the luxuriant herbage. The valleys of our southern border, more beautiful than Arcadia, with suns and winds as genial as Tempe, will surpass the gardens of Alcinous in the richness and variety of their fruits. These mountains, richer in dews than Hermon, and hills more fruitful than Olivet, will surpass the vine-clad hills of Italy and Greece in the extent of their vineyards, and vie with Falernium and the Rhine in the quality of their wines; and the broad table lands of the Southwest, with fountains more limpid than Castalia, will surpass Judea and all the Orient in its flocks and herds.

When industrial education shall have accomplished all these happy results; when the farmer's "Speed the plow" is heard from all our broad prairies; when the rustic pipe of the shepherd shall gladden our southwestern highlands, and when every hillside shall be vocal with the vine-dresser's song, then shall our youth hasten to engage in these rural pursuits as an *everlasting holiday*, and sing with Virgil:

"Would you be strong? go follow up the plow;
Would you be wise? go study fields and flowers;
Go seek your school in nature's sunny bowers.
Fly from the city; nothing there can charm—
Seek wisdom, strength, and virtue on a farm;

"Where fraudless innocence and peaceful rest,
Unbounded plains and endless riches blest,
Where caves, and living springs, and airy glades,
And the soft low of kine, and sleepy shades,
Are never wanting."

GRAPE CULTURE IN MISSOURI.

BY PROF. G. C. SWALLOW.

There is, perhaps, no department of husbandry in which cultivators find so much difficulty and meet with so many failures as in the cultivation of the vine; and yet, while some fail, it is equally true that others meet with eminent success. It is quite obvious that the most of those who have failed in their efforts must attribute their failures to the want of adaptation, in their modes of culture, to the habits and wants of the vine; as others, on the same soil and under the same sun, have been most successful.

Notwithstanding the true principles of grape culture are so little understood by the community at large, no department of agriculture has been more carefully investigated, more distinctly defined and reduced to scientific principles. Since Virgil wrote his masterly treatise upon the habits and cultivation of the vine, the principles which should govern its culture have been within the reach of all who would investigate the structure of this plant, and learn the soil and climate adapted to its perfect development. And, indeed, it could scarcely be otherwise, as the vine has occupied so prominent a position in the husbandry of almost all the enlightened nations of ancient and modern times. Since Noah planted a vineyard, the vine has followed the progress of husbandry and civilization throughout India, Arabia, Palestine, and Southern Europe. It holds an important place in the history of those seats of ancient civilization and progress. The "vine-clad hill" occupied a conspicuous position in every landscape, and the juice of the grape had its place at the social board and ruled the joys of the banquet hall. While it held so important a position among the nations, its value led the ablest minds to investigate its habits and deduce the best modes of culture from the experience of the many engaged in the pleasant pursuit. Solomon investigated the properties of the vine, and Virgil gave so excellent a treatise upon its habits and culture that the investigations and experience of the last two thousand years have added but little to the knowledge then possessed. Since then the habits of the vine, and the modes of culture best adapted to it, have been so carefully determined, and so thoroughly established by the experience of the last four thousand years, it only remains for the cultivators of our times to investigate the modes of culture so long and so successfully practiced in India and the countries bordering upon the Mediterranean; to inquire how far the varieties then cultivated, and the culture then adopted, will succeed in other localities; to determine whether some new varieties may not succeed better in other climates and soils; and what modifications of culture will secure the highest degree of success in the various soils and climates to which we would introduce the vine.

It is obvious that the success of the grape depends upon the mutual adaptation of both soil and climate. In places where the soil has all the requisite properties, the climate may be such as to prevent full success; as in many parts of New England, where the climate is too cold, and in England, where it is too moist. In many localities in Southern Europe the soil is such as to prevent the full success of the vine, though the climate is all that could be desired.

SOIL.

According to Virgil[*] and the best authors who have followed him, the soil should be *warm*, *light*, *dry*, *and rich in alkalies* and *alkaline earths*—especially *potash*, *soda*, *lime*, and *magnesia*. The best vines have been grown[†] upon soils of this description, and when any of these qualities have been wanting the most skillful vine growers have carefully supplied them by artificial means. Hence Virgil directs to place "porous stones and rough shells" in the trenches—the stones and shells to loosen the soil and perfect the drainage, and the shells to supply the defect of lime. The vine has ever succeeded the best, other things being equal, in a calcareous soil. The best vineyards upon the Rhine, the Ohio, and the Missouri are upon soils rich in lime; and, according to D'Orbigny, the wines from such in France are more lively and spirituous.

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[*] Geor. Lib. II, lines 217-221 and 262—"*Optima putri arva solo.*"

[†] The great vine at Windsor Park was planted about fifty years ago. "In 1850," says Prof. Lindley, "it produced 2,000 large bunches of magnificent grapes, filled a house 138 feet long and 16 feet wide, and had a stem 2 feet 9 inches in circumference. The border in which it grows is *warm*, *light*, *dry*, and *shallow*."

The chemical composition of a plant also gives us sure indications of the mineral ingredients of the soil required for its perfect development. The following table, from Johnston's Agricultural Chemistry, contains the compositions of five vines grown on five different soils. The result shows most conclusively what mineral substances are demanded for the perfection of the vine:

	By Leibfrauen.	By Weinsheimer	Primary Rocks. Gratz.	Mountain Limestone. Gratz.	Mica Slate.	Mean.
Potash	17.32	25.24	34.13	24.93	26.41	25.60
Soda	28.50	2.74	8.03	7.31	8.79	11.07
Lime	29.75	40.75	32.67	37.59	33.47	34.85
Magnesia	9.78	7.47	4.66	7.12	9.16	7.64
Oxide of iron	4.12	1.52	0.16	0.24	0.19	1.25
Phosphoric acid	5.20	18.87	16.35	19.55	16.87	15.37
Sulphuric acid	1.96	2.88	2.16	2.37	2.44	2.36
Chlorine	1.82	0.53	0.50	0.35	0.25	0.68
Silica*	1.55		1.45	0.62	2.48	1.22
Total	100.	100.	100.11	100.08	100.06	100.04
Per centage of ashes in dry twigs	2.885	2.689	2.525	2.25	2.325	2.525

These analyses show that potash, soda, lime, magnesia, and phosphoric acid enter largely into the composition of the vine, and that grapes will succeed best on soils rich in those materials. The other ingredients are such as are found in nearly all soils, and may be left out of our investigations.

It is a well-established principle of vegetable science that *lime* may supply the place of *soda* and *potash*, in part at least, in some plants. The following analyses of vines from two localities show this to be true of the vine also:

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*Mr. Phillips says some of our soils are deficient in silex, but these analyses show that the vine contains less than two and a half per cent. of silex, and our soils contain from fifty to ninety per cent. of that mineral. The soil which contains the least silex is the best grape soil. (See p. 12.)

	I.	II.
Alkalies	45.82	27.98
Lime	29.75	40.75

If, therefore, soda and potash be deficient in the soil, their place may be partially supplied by lime, should it exist in sufficient quantities.

CLIMATE.

The success of the grape on the islands and the shores of the Mediterranean show their adaptation to a climate in which the winters are short and mild, and the summers are temperate and equable. In the Ionian Islands, where the grape attains great perfection, it is never exposed to pinching cold or burning heat, or to any very sudden changes from one to the other. But the great profusion and excellence of the grapes in India, at Candahar and Cabul, the sunny home of the grape, indicate an ability to reach perfection in spite of sudden changes from extreme cold to burning heat. "In no part of the world," says Lindley, "are the grapes more delicious than in Candahar and Cabul;" and yet the traveler speaks of the bitter cold wind and blazing fires at night and the burning sun by day, in March, and the sun's heat at 140° in May, where the grapes ripen as early as June.

We may conclude, then, that the grape will, under favorable circumstances, reach the greatest perfection though exposed to sudden changes and extremes of heat and cold.

Having ascertained the conditions of soil and climate best adapted to the successful culture of the vine, it has been my aim, during the progress of the geological survey of Missouri, to determine how far these conditions are fulfilled in Missouri; to what extent and with what success the vine may be cultivated in our State, and the advantages to be derived from its cultivation. In order to secure the most accurate data for our conclusions, our investigations have been directed to the following subjects:

1. The characters and habits of all our native vines, and the soils on which they succeed best, have been carefully noted.

2. Five persons* have been appointed to make meteorological observations—one at Springfield, in the Southwest; one at Cape Girardeau, in the Southeast; one at Palmyra, in the Northeast; one in St. Joseph, in the Northwest, and one at Columbia, in the center, in the valley of the Missouri river. These observers have been supplied with the very best instruments, and they have made and recorded

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*It gives me great pleasure to bear testimony to the disinterested labors of those who have so faithfully observed and recorded the meteorological phenomena at the stations above named. Our State will be under many obligations to the Rev. G. P. Comings, of St. Paul's College, Palmyra; Rev. James Knoud, of St. Vincent's College, Cape Girardeau; J. A. Stephens, Esq., Springfield; E. B. Neely, A.M., of the St. Joseph High School; and Miss M. B. Hill, at Columbia—who have made the observations at their several localities.

their observations according to the plan adopted by the Smithsonian Institution.

3. The experience of our most successful vine growers has been collected, and the results carefully compared with the conclusions derived from our examinations of the climate, soils, and wild vines of the State.

4. The soils of the State have been carefully observed, and the varieties collected and submitted to a most skillful chemist for full and accurate analyses.

NATIVE GRAPES.

The growth and fruit of our native grape vines give us most important indications of the adaptation of our soil and climate to the cultivation of the grape. The following species have been observed—the growth, habits, and fruit of each variety have been carefully examined:

I. VITIS ÆSTIVALIS. *Summer Grape.*

This vine is found in all parts of the State. It attains to a very large size* in our rich alluvial bottoms, and on our best upland soils; but the vines of a smaller size, which are found on the poorest soils in the State, produce much the best grapes. Those which grow upon the dry ridges, on the declivities of the bluffs (especially those of the magnesian limestone), and on the talus of debris at their bases, exhibit a healthy, firm growth, and produce an abundance of fine fruit. The grapes found in these localities are larger, and the pulp is more juicy and palatable. It is often used for wine.

II. VITIS RIPARIA, *Michx.* *River Grape.*

This vine is abundant in the rich alluvial bottoms on the borders of our streams, and is, doubtless, the largest of all our vines. It is one of the most striking objects in our magnificent forests; while the stem, like a huge cable, hangs suspended from the limbs of the largest trees, the branches clothed in rich foliage, and often loaded with fruit, hang in graceful festoons over the highest boughs. But the vines growing on the thin soils of our limestone ridges and bluffs. and on the loose debris at their bases, where they are more exposed to the air and the sun, produce a greater abundance of fruit. There are many varieties between this and the *æstivalis*. Some vines have the thick leaves of the summer grape and the small sour fruit of the *riparia*. The clusters of the summer grape are often short and cylindrical, without shoulders.

III. VITIS CORDIFOLIA, *Michx.* *Winter or Frost Grape.*

This vine is widely diffused through the State; but it is not so large as the summer grape. Its fruit is small and acerb. There are many varieties between this and the last species.

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*This vine often attains a diameter of 10 inches, ascends the loftiest trees, and spreads its branches over their highest boughs.

IV. Vitis Vulpina. *Muscadine, Southern Fox Grape.*

I observed this vine only in the high portions of the swamp country of Southeast Missouri. My attention was first called to it by Dr. Horner, of Dunklin county, where we measured a vine nine inches in circumference and one hundred and thirteen feet high.

V. Vitis Rupestris. *Texas Grape, Rock Grape.*

I observed this peculiar vine in several places in the rocky beds of "dry branches" in Franklin county. Its fruit is nearly as large as the summer grape, in small clusters. It ripens before the summer grape, in August. It does not climb like other grapes, but runs along the dry beds of the water courses, sending down roots from the joints of the canes as it progresses. Its foliage resembles that of the Clinton grape. It should be cultivated.

VI. Vitis ——.

There is a grape rarely found in this State (very abundant in Kansas) which is distinct from any of the preceding. It resembles the river grape in the foliage and size and habits of the vine; but the berry is larger, in small, compact, shouldered clusters. It ripens in July. The berry is acid, and filled with a purple pulp and highly-colored juice.

VII. Vitis Indivisa.

I saw this vine at the Chouteau springs, in Cooper county, and in Holt county.

VIII. Vitis Bipinnata.

This vine is found on the river banks in Cape Girardeau and Pemiscot counties.

From this list it will be seen that Missouri possesses nearly all the native grapes of our country. The vines are so abundant and so large as to form an important and conspicuous part of every copse and thicket throughout the entire State. They are everywhere present, lending grace and beauty to every landscape, and indicating, with prophetic certainty, that the day is not far distant when the purple vineyards will cover our hills, the song of the vine dresser fill the land with joy, and the generous juice of the grape will improve our moral, intellectual, and physical powers.

EXPERIENCE OF OUR VINE DRESSERS.*

Several vine dressers in our State have been engaged in the cultivation of the grape during the last twelve or fourteen years. Their success has been fully equal to their expectations; and they are full of high hopes of the most useful and profitable results, even of entire and *permanent success.* Their experience in cultivating the vine has led them to the same conclusion that we have deduced from our scientific examinations of the soil, climate, and native vines, viz.: *that the vine can be cultivated with entire success, in favorable localities, in all parts of the State.*

It should be borne in mind that these results have been derived mostly from vineyards in the valley of the Missouri and Mississippi rivers, which are not, by far, the most favorable localities in the State; for the "mildew" and the "rot," the most formidable obstacles they have to contend with, may be partially or entirely obviated in the localities where the atmosphere and soil are not so densely charged with moisture. "The *rot,*" says one of our most successful vine dressers, Mr. Haas, "attacks the berries when the soil is in a wet condition, in July and August." "It is most severe on the low and wet parts of the vineyard." Mr. Husmann says, "the principal cause, all are agreed, is an excess of moisture about the roots, and damp, moist weather." Now the larger parts of our vineyards are located upon a *stiff, cold, clayey subsoil,* which of necessity retains the excess of moisture and produces the injurious results.† This evil may be obviated by thorough draining and preparation of the soil; or what is better, by selecting some of the millions of acres in the southern part of the State, where the soil is *warmer* and *lighter,* and richer in the ingredients most favorable to the vine, and where the subsoil is so porous as to permit a free passage to the excess of moisture.

The *mildew* appears in June, and all agree that it is caused by "*foggy, damp,* and *hot weather,* accompanied by *mists,* which is much more prevalent in the valleys of our large rivers than on the table lands of the south.

The characters of the two regions under comparison show most conclusively that the excess of moisture in the valleys must be considerable and permanent. These valleys are covered with numerous and extensive lakes and sloughs, and forests of rank growth and vast extent, besides the broad rivers which flow through them; while the table lands are almost destitute of lakes and ponds, and but partially covered by a very sparse and much less vigorous growth of timber. And, besides, they occupy an elevation of several hundred feet above the valleys.

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*I am indebted to Mr. Wm. Haas, of Boonville; Mr. Geo. Husmann, of Hermann; Mr. Frederick Muench, of Marthasville; and Mr. Joseph Stuby, of Hamburg, for valuable information respecting the cultivation of grapes in our State.

†See soil No. 12, page 12.

No fears, therefore, need be entertained that these obstacles will prevent the entire success of vine culture in Missouri, should our atmosphere even continue as moist as at present. But we may expect much improvement in this respect, as it is fully established by past experience that the settlement of a country and the opening of a soil to cultivation lessen the amount of rain and moisture in the atmosphere.

Notwithstanding the many difficulties our vine dressers have had to contend with, and notwithstanding some of their vineyards are not, to say the least, in the most favorable localities in the State, their success has been very flattering.

The vineyards of Boonville have yielded the present season* about 6000 gallons, worth $12,000. Five acres gave a clear profit of $2000, or $400 per acre. Mr. Haas made 1550 gallons from 3 acres.

The vintage of Hermann was about 100,000 gallons, from less than 200 acres. At $1 per gallon, which is less than the value, it will give a profit of at least $400 per acre, or of $80,000 on the 200 acres in cultivation. One small vineyard at Hamburg (Mr. Joseph Stuby's) yielded over 1000 gallons per acre.

The entire cost of vineyards, preparing the soil, setting and training the vines till they come into bearing, varies from $200 to $300 per acre; annual cost of cultivation after, $50 to $60 per acre; ten per cent. on first cost, $20 to $30 per acre; total expense for each year, $70 to $90 per acre. So that an income of $100 per annum for each acre is sufficient to pay the interest on the first cost and the expense of cultivation.

Judging from the statistics before me, I would suppose all our vineyards have yielded an average of at least 250 gallons per acre since 1849, which, at an average price per gallon of $1 60, would give an annual income of $400, and a yearly profit of $300 per acre. So that the vine dresser, even in the poorest seasons, can scarcely fail of a handsome profit; while in good years his gains will far surpass those derived from any other department of husbandry. But the profits of our most successful cultivators have been much greater. Mr. Pœschel, of Hermann, is said to have made over 400 gallons per acre for the last ten years, and an annual profit of more than $500 for each acre.

Such are the favorable results legitimately derived from the experience of our vine dressers, in their early efforts in a new country, with a soil and climate unknown to the cultivators of the grape. All must admit that they are most satisfactory. Even if our climate does not become more dry, if no more improvements are made in the modes of culture, and if no more favorable localities are obtained grape culture must increase very rapidly, and become an important element in our agricultural and commercial interests.

CLIMATE.

It will be impossible to give, in the few pages allotted me in this communication, the results of our meteorological observations. It must suffice to state, in general terms, that the extremes of heat and cold are not so great as in some of the best grape-growing regions; and that the atmosphere in the southern part of the State is sufficiently dry. The results, in short, present but one very objectionable feature. There are occasional changes of temperature so great and sudden as to prove somewhat injurious to the grape at certain stages of its growth. But it should be observed that these changes are not so marked in the high table lands of the south and west as in the north and in the valleys of the Missouri and the Mississippi, where our vineyards are located; and, even where most objectionable, they are not so great as in India and other grape-growing districts of the old world.

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*1857. During the last ten years grape culture has been greatly extended, and its profits much increased.

That portion of Southern Missouri extending from Newton county, in the Southwest, to Ste. Genevieve, in the Southeast, usually represented as the eastern extremity of the Ozark* mountains, is in fact a table land, varying from 1000 to 1500 feet above the ocean. In the west it is sufficiently undulating to be well drained; while in the east it sometimes rises into ridges and knobs of moderate elevation. From this table land the country descends by moderate slopes in every direction. On the northern slope the headwaters of the Sac, Pomme de Terre, Niangua, and Gasconade, flowing into the Missouri; on the east, the Meramec and the Big, flowing into the Mississippi; on the south, the waters of the St. Francis, the Current, and the White with its tributaries, descending toward Arkansas; and Spring river and Shoal creek on the western slope.

The valleys of the numerous streams which flow from this table land are at first but little depressed below the general level; but the further they descend the deeper and wider they become, until they expand into broad alluvial bottoms, bounded by bluffs more or less precipitous. The fountains are numerous, bold, and pure; the streams clear and rapid.

The surface of these table lands is undulating, with no mountains or arid plains to disturb the equable and agreeable temperature which usually prevails at that elevation under the 37th parallel of north latitude. There are no swamps or overflowed lands from which vapors and noxious exhalations can arise to render the air damp and unhealthy. As these facts plainly indicate, the summers are long, temperate, dry, and salubrious,† and the winters short and mild. It possesses the clear, brilliant skies of Italy, and the dry, bracing air of the western prairies.

SOIL.

Nearly all the soils of Missouri possess all the ingredients necessary to the complete development of the vine; but some of them are too heavy, wet, and cold, unless improved by artificial means. This is true to some extent of those on the bluffs of the Mississippi and Missouri, where nearly all the vineyards of our State are located. These soils are based upon the bluff formation, where it contains more clay and less lime than in the western counties, which possess our best soils.

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*A strange idea has been advanced that the growth of native wines show that an elevation of from 400 to 800 feet is the best for grape culture; but neither the native nor the cultivated grapes give any such indications in Missouri.

†According to the census report of 1850, this is one of the most healthy regions in the country.

Analyses of Soil from the bluffs of Boone Co., by Dr. Litton.

	No. 12 A.	No. 12 B.	No. 12 C.
Water expelled by drying at 150° C	0.4105	0.6558	0.8030
Organic matter and water not expel'd at 150° C	3.0957	2.6049	3.8901
Silica, etc., insoluble in hydrochloric acid	90.1420	90.8063	85.0571
Soluble silica	0.1384	0.1475	0.2187
Alumina	3.0654	2.9346	4.7672
Peroxide of iron	2.0553	2.0590	3.8814
Oxide of manganese	a trace	a trace	a trace
Lime	0.2086	0.1242	0.4722
Magnesia	0.3423	0.2088	0.6581
Potash	0.3368	0.2121	0.3895
Soda	0.1828	0.2925	0.1220
Phosphoric acid	0.0560	0.0346	0.0556
Sulphuric acid	0.0035	0.0508	0.0099
Chlorine	0.0000	0.0000	0.0276
Total	100.0373	100.1311	100.3524

No. 12 A was collected from 2 to 6 inches below the surface; No. 12 B, from 10 to 12; and No. 12 C, from 18 to 20 below the surface, on a high ridge.

This soil is very similar to those upon which the vineyards of Boonville, Hermann, and Hamburg are located; and it produced an abundance of large and excellent grapes, on small vines of the *Vitis æstivalis*. The superior native grapes growing upon this soil, and the success of the vineyards above named, prove its adaptation to the vine. Its greatest defect is a capacity to hold and retain an excess of water; which must be remedied by trenching and a proper admixture of vegetable matter, sand, pebbles, and broken limestone. This labor, however, may be avoided by selecting some of the millions of acres in southern and central Missouri, the soils of which are already prepared—as if by design—to invite the vine dresser to possess and cultivate them.

Analysis of a Magnesian Limestone Soil from the Southern Bluffs of Callaway County, by Dr. Litton. Soil No. 14.

Water expelled by heating to 150° C.	1.1700
Organic matter and water not driven off at 150° C.	9.6299
Silica, etc., insoluble in hydrochloric acid	54.2600
Soluble silica	0.1639
Alumina	10.8588
Peroxide of iron	2.5186
Manganese	a trace
Lime	8.0729
Magnesia	1.6600
Potassa	1.6378
Soda	0.3442
Carbonic acid	10.1111
Sulphuric acid	0.0605
Phosphoric acid	0.0950
Chlorine	0.0053
Total	100.5880

This is by far the best grape soil in the State. It contains more lime, magnesia, alumina, potash, organic matter, and less silex than any other.

It is all that could be desired for the culture of the grape; it contains an abundance of all the mineral substances which enter into the composition of the vine, as shown above by its analysis. While it is *warm*, *light*, and *dry*, it contains large quantities of magnesia and vegetable matter or humus, giving it great capacity for absorbing and retaining a sufficient quantity of moisture, even in the drouths of summer. This is a fair representation of the soils on the magnesian limestone ridges and slopes throughout Central and Southern Missouri. These slopes and ridges occupy millions of acres, now deemed worthless, which are, in fact, by far the most valuable lands in the State for the cultivation of the grape; especially is it true of those located upon the southern highlands, away from the vapors and sudden changes of our large rivers and their broad valleys.

The magnesian limestone series occupies a large portion of Southern Missouri, and is made up of magnesian limestones, sandstones, and porous chert, which are usually overlaid with thin beds of reddish-brown marly clays. The sand, lime, magnesia, and alumina derived from the decomposition of these rocks, together with the abundance of vegetable matter and the alkalies derived from the fires which annually overrun this country, combine to form a soil* *light*, *dry*, *warm*, and rich in *potash*, *soda*, *lime*, *magnesia*, and all the other mineral ingredients needed to render it fertile, and suitable in an eminent degree for the culture of the vine. In many places this soil is underlaid with a sufficient quantity of pebbles and fragments of porous chert to constitute a most thorough system of drainage; while in others the fragments of chert are disseminated through the soil in such quantities as to injure it somewhat for ordinary cultivation, but giving precisely the preparation so highly recommended by Virgil and later authors, and the best cultivators of the grape. It is true that the native vines do not grow so large and sappy on this as on the deep, damp soils of the State; but they are, nevertheless, strong and healthy, and produce finer clusters of larger and better grapes. This improvement was particularly observed in the *summer grapes.*

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* See preceding analysis No. 14.

This variety of soil also extends over a large portion of the counties on both sides of the Osage, and over the southern part of Boone, Callaway, Montgomery, and Warren, on the north side of the Missouri, occupying in all an area of some 15,000,000 acres. Of these, at least 5,000,000 acres might be selected in the most desirable localities and devoted to vineyards, without encroaching upon the lands most desirable for other departments of agriculture. And so far as we can judge from the characteristics of soil and climate and the indications of the native vines, these 5,000,000 acres in the highlands of Southern Missouri present rare inducements to the vine dresser—such a combination of favorable circumstances as will not fail to attract the attention of those who would engage in this most pleasant and profitable department of husbandry. And so important will be the results, that every effort should be put forth to hasten the time when these 5,000,000* acres shall be covered with flourishing vineyards, giving profitable employment to 2,000,000 people, yielding more than 1,000,000,000 gallons of wine, and an annual profit, at the lowest estimare, of $500,000,000. And what is still more important, the pure, nourishing juice of the grape would take the place of the vile, maddening compounds used under the names of wine and brandy; drunkenness would give place to sobriety; our people, nourished by the grape and its pure wines, would become as robust and hardy as they are now daring and indomitable.

NATURAL TERRACES.

The bluffs of the numerous streams in Southern Missouri, and in the valley of the Osage, usually slope back into the knobs and ridges, which are frequently surrounded by numerous natural terraces so regular and uniform that they appear like the work of human hands, as seen in Plate VIII. These terraces are produced by the decomposition of the strata of magnesian limestones which form the bluffs. Their hight varies from one to six feet, and the width of the top from two to twelve, according to the angle of the slope and the hight of the terrace. Their surfaces are nearly level, and usually covered with a light, warm, and rich soil, containing fragments of chert and the decomposing limestone, all wonderfully prepared by nature for the planting of vineyards. These terraces generally surround high, open ridges and knobs, exposed to the free circulation of the dry atmosphere of the region under consideration. We have observed but one objection to their use for vineyards. In some places the soil does not appear sufficiently deep to secure the vine against the effects of drouths. But, as an offset to the want of depth, it always contains large proportions of carbonate of magnesia and humus, which give a great capacity for absorbing and retaining moisture; as these substances possess this capacity to a greater degree than any of the other ingredients of our soils. And besides, the thinnest soils on these terraces sustain a vigorous growth of prairie grasses, flowers, shrubs, and vines, which produce the finest quality of grapes in great profusion.

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* France has about 5,000,000 acres in vineyards. They yield about 925,000,000 gallons of wine, besides the 95,000,000 gallons distilled into brandy, and give profitable employment to 2,000,000 of people, mostly women and children.

CAVES.

There are numerous spacious caves in all parts of this interesting country. The temperature of those measured ranges between 50° and 60° F. Many of them would make most excellent wine cellars, as their temperature is sufficiently low and uniform to prevent that acidity to which the wines of all temperate latitudes are predisposed. It should also be borne in mind that this is the richest mineral region in the Mississippi valley. It abounds in mines of lead, zinc, copper, cobalt, and mountains of iron, and quarries of marble; and, besides, its agricultural resources are sufficient to sustain a population of many millions.

These facts respecting the *native vines*, the *climate*, the *experience of our vine growers*, and the *soil*, clearly prove the capacity of Missouri to become the great wine-growing region of our continent. They should encourage those noble spirits who have so faithfully devoted their labor and their money to promote this important department of husbandry in our midst; for the time is not far distant when the "*poor flint* ridges" and *terraced slopes* of Southern Missouri will be as valuable for vineyards as some of them are now for their rich mineral deposits. The vine-clad hills of the beautiful Niangua will vie in wealth with the leaden veins of Potosi and Granby.

THE MINERALS OF MISSOURI.

Address delivered before the State Board of Agriculture and Members of the Legislature of Missouri, in the Hall of the House of Representatives, at Jefferson City, January 30, 1868.

BY R. S. ELLIOT, OF ST. LOUIS.

It is an ordinance of civilization that men must reciprocally serve each other. There is a mutual dependence of the useful avocations, and each is subservient to all others. Hence, the development of the mineral resources of Missouri is a subject of interest, more or less, to all classes of her people; and if anything can be said to illustrate the value of her mines, the labor will possibly not be lost.

Many volumes have been uttered on the "vast mineral wealth of Missouri." It has been a favorite theme. Magnificent rhapsodies have been indulged in; perhaps some hyperbole; but not much exaggeration. Eulogy has not gone far, if at all, beyond the truth; for all the ordinary phrase of laudation is exceeded by the reality.

Missouri has coal. She has the useful metals. She has salts and pigments. She has sands and clays for the arts. She has rocks and earths for almost every use of man, from the lithographic stone to the huge column of the temple.

It is true that this vast wealth is mostly dormant; but let us not regret the fact. It is better for future generations, and as well, perhaps, for the present, that the sleep of ages is yet in a great measure unbroken. Enterprise, energy, and capital have an ample field left to them, promising an ample harvest; and, in numerous instances, the novelty of discovery will attend the acquisition of profit.

Nor is it to be imputed to us in disparagement that there is so much remaining to develop and to enjoy. Time and circumstance concur in unfolding physical resources. The order of existence is directed by Supreme wisdom, and we are neither to wonder nor complain that everything is not sooner wrought out. The "time for all things" must not only be served when it comes, but it must be waited for.

The markets of Tyre were supplied by Phœnician seamen with tin from Cornwall, and the old Romans wrought metals there; yet the great value of the metallic resources of that corner of England has only been demonstrated within the last one hundred and fifty years. Pits two thousand feet in depth, galleries measuring scores of miles, and even extending under the sea, are very modern achievements.

Three thousand years ago the expansive force of steam was known, and used by pagan priests in the service of their altars; yet only within a hundred years has the steam engine become the omnifarious servant of man. Papin, Savary, and Watt might have lived thousands of years earlier; but it was not so ordered.

The architects of Baalbec, of the Karnac, and the Pyramids lived in the time appointed. So, also, did George Stevenson. To transport the ponderous stones of ancient temples might have overtasked the self-taught coal miner of Killingworth. It was not his allotted work. But he could build a railroad; he could give life to the locomotive; he could vitalize the daily commerce of mankind.

Archimedes might have toyed with the lightning as well as Franklin; but it was not so to be. And Franklin might have given us the telegraph as well as the lightning rod, if such had been his destiny.

Our great river rolled in solitude for ages before DeSoto beheld it or the pirogue of the trader floated on its bosom; and but little over a century has elapsed since the steamboat first parted its waters.

Yet the steam engine, the railroad, the locomotive, the steamboat, and the telegraph, all came in their appointed time; and, except the first, all within the last three score years and ten. We censure not past ages because they came no sooner. And none may justly complain of Missouri that her progress has not been more rapid. Her people have had the wilderness to conquer; and, in subduing the asperities of nature, they have already achieved results of magnitude.

But Missouri has now reached a point in her existence when we may expect her progress in all other respects to be greater, and, consequently, her mineral wealth to be more extensively developed than ever before. Capital has been accumulated in manifold forms, including improved means of transit; and events have virtually changed our geographical position, giving us advantages of immigration and growth not enjoyed in past years.

A quarter of a century ago, to the west of the State, all was wilderness, even to the borders of the Pacific. Except the sparse commerce of the trappers, and the limited overland trade to Mexico, civilization was unknown over more than a million square miles. Geography had on her maps the "great American desert," the unfruitful mountains, and the expanse of barrenness beyond.

> "Afar through trackless waste and solitude
> The lone Missouri poured her turbid flood,
> Where all was primitive, unknown and vast;
> And save the thunder peal, the hurtling blast,
> Or tramp of herd, or savage man all wild
> Awoke the echoes, they for ages past
> Had slept unwoke. And Sabbath had not smiled,
> Nor bells their summons given to temple undefiled."

On the east and north of us States were yet filling up, and had abundance of cheap lands left to tempt the emigrant. Our resources were comparatively unknown. Our "institutions" were distasteful to thousands of active men seeking western homes; and powerful influences were exerted against emigration to Missouri.

The growth of the State, though rapid, was less rapid than that of States more auspiciously situated. It was advancement under difficulties. And, at the same time, the outside world was wonderfully ignorant of the progress we had actually made.

Now, all is changed. States and territories are organized west of us, away to the Pacific slope. The shores of populous American commonwealths are laved by the far-off sea. In the golden soil of California giant enterprises spring up, which subdue even the Sierra Nevada, and stretch a railway across its hights. In the gulches of the Rocky mountains Mammon unfolds his glittering treasures, and the whilom desert is spanned by the iron tracks of commerce. The Pacific railroad of Asa Whitney, the visionary project of 1845, is realized in 1868, and in a few years will belt the continent in duplicate lines.

Missouri is no longer the border State. In our system of labor we have no longer anything that offends, and we cannot now be disparaged and depreciated.

As her climate, soil, and material resources warrant, so is Missouri at length valued. She is rapidly adding to her people, her highways, her wealth, and her attractions.

The time seems, therefore, to have arrived when we may expect the minerals of the State to be sought out with all the vigor of adequate capital, and all the aids of progressive science.

It was requisite to bide the time. In all localities, where supposed to exist, the precious metals are apt to be sought at once. Gold and silver inflame the imagination, and all obstacles of distance or hardship are overcome in their pursuit. But coal and iron, lead and copper, are social interests, related to others, and not apt to live alone. Hence the natural result, that the coal and the metals of Missouri should be only partially developed until population, capital, and means of intercourse were duly advanced.

Scarce half a century has elapsed since the anthracite coal of Pennsylvania was first taken from the mines to market, or its uses known; a mineral whose annual value is now fifty millions of dollars. It is not over thirty years since the iron ores of Pennsylvania began to be smelted in furnaces using anthracite coal. How greatly the people of that State have since prospered, by means of coal and iron, and how vigorously they are moving forward, is known to all intelligent men.

The great coal and iron age of Pennsylvania began when time was ripe. We may fairly expect a similar experience in Missouri. Forty years ago all the iron of Pennsylvania was made by charcoal, as that of Missouri is now; and the future progress of mineral development in Missouri is as certain as the past operations in Pennsylvania have been extensive and profitable.

COAL IN MISSOURI.

The coal field of Missouri is said, by geologists, to extend over 26,887 square miles—an area nearly four times the size of Massachusetts, and more than half the size of New York or Pennsylvania—breadth enough to make about thirteen States like Delaware, or twenty like Rhode Island. This immense tract is estimated to average, for the entire area, five feet in thickness of workable coal, giving as the aggregate store a grand total of more than one hundred and thirty-four thousand *millions* of tons!

Stupendous figures (134,000,000 tons)! and difficult to grasp. But we get an idea of their significance by supposing the consumption to be one hundred millions of tons a year, at which enormous rate we shall have enough to last us thirteen hundred and forty years.

It is hard to realize the magnitude of such a body of coal. The consumption of all kinds of coal in Pennsylvania, great as it is, does not probably exceed (including exports to other States) twenty millions of tons a year. We may, therefore, raise from our Missouri mines *five times* the present annual product of Pennsylvania, and yet have more than enough for thirteen centuries!

These estimates of the area and amount of coal in Missouri may seem extravagant; but if they are deemed too large, we may reduce them by *three-fourths*. We may suppose the aggregate store of workable coal to be only thirty-three thousand five hundred millions of tons (33,500,000), and yet we shall have enough, at a rate equal to the present yearly consumption of Pennsylvania, to last us for almost as long a period as the Christian religion has been taught. This immense coal field underlies a region of great agricultural value, where all the crops of the temperate zone are matured in perfection; it is a region doubly blessed, having a rich and kindly soil on the surface, and inestimable stores of fossil fuel a few feet beneath. In this respect our State is favored much beyond Pennsylvania; our agricultural resources are so much greater in our coal regions than those of similar localities in that State. Pennsylvania digs her coal mostly from barren mountains. Missouri will raise hers from beneath the soil of fertile plains.

Not only in supplying cheap fuel for the dwelling, but as securing to us a motive power for all purposes, and without limit, will this coal prove to be of incalculable value. Home and fireside comfort and productive industry are alike to be promoted by its agency.

Before the day of the steam engine, men relied for the propulsion of machinery on muscular power, on water power, or the power of the fitful winds; the first inadequate to large work, the second only existing in particular localities, and the last too capricious for any factory that requires also much manual service. Woolen or cotton mills without the steam engine would be dependent on water courses, and however inconvenient the locations, the matter or motive power would be imperative.

But the steam engine frees us from dependence on either muscle or water-fall, or wind to put our machinery in motion. A factory may be established, or a factory town built up in any locality where labor, raw materials, and ready transportation come together; but always better if cheap fuel be there also. And we accordingly find that factories and factory towns grow into existence where circumstances thus concur.

The numerous towns and cities which, within a score of years, have sprung up in Ohio, in Indiana, and in many parts of Illinois, on the railroads and rivers, where supplies of coal are accessible, are apt examples of this operation of cause and effect; and of the increase of population in those States, within a few years, a large share has been due to the growth of towns caused by the increase of manufacturing industry.

The history of Missouri will soon present similar facts. Our people will not be content to continue importers of nearly all manufactured articles, particularly of those for which we have the raw materials. It is safe to say that the day is not distant when large manufacturing and trading populations will be gathered in towns and cities, on the lines of our railroads, in all parts of our wide-spread coal regions.

Not for home consumption only, but also for distant markets, will our manufacturing industry be exerted. To the south and southwest of us labor will not for many years be so abundant and diversified as to supply the domestic consumption of fabricated articles. Missouri will, in time, be a strong competitor in supplying those regions where the heat and moisture, which bring to perfection sugar and cotton, are unpropitious to general manufacturing industry.

Away in the recesses of the Rocky mountains, where but a lustrum since the solitary trapper or the roaming Indian was the only human form, the miner is now burrowing the everlasting hills, and the patient goldwasher panning out the sands of the laughing waters. Towns and cities of no mean pretensions are scattered through the late wilderness. Even where irrigation is a necessity of climate, agriculture appropriates the soil, confident that, while the *acequia* absorbs a portion of labor, the full bounty of the harvest is thereby secured. The millions of people who will soon be settled in the mountain ranges will be consumers of manufactured articles in great variety and amount, and a part of their supplies, at least, will be furnished by Missouri.

Centers of art, skill, industry, and production within our borders, will year by year increase and multiply; and a population aggregating hundreds of thousands, with all the wants of civilized life, will be clustered in Missouri towns, not only relying for meal and meat on the farms of their vicinity, but also demanding the wholesome products of the garden and the generous fruits of the orchard and vineyard—at once patrons and stimulators of agriculture and horticulture—providing freights for our railroads, and promoting our general commerce in all its ramifications.

To suppose that those results are not in the future, is to suppose that causes elsewhere producing certain effects are to be inoperative in Missouri. It is to suppose that we alone, of all the American world, are to remain at rest.

On the contrary, Missouri feels new currents of life in every member of her giant frame. Her people, increasing at the rate of two hundred thousand a year, cannot long depend on distant factories for almost every implement and utensil of daily use.

Our soil and climate are not held in vain. Intelligent cultivators have already shown their capabilities, and will not pause in the career of progress in all branches of culture. And it is impossible that our coal shall be so neglected as not to yield the results, in stimulating industry and promoting the increase of wealth, that we may believe the Creator intended when our vast supplies were placed where they are.

THE METALS OF MISSOURI—IRON.

In greater or less abundance, the metallic resources of Missouri are diffused over an area of more than twenty thousand square miles. In this vast domain there are hundreds of localities giving such promise as to justify enterprise in searching out their treasures; and there are many spots of unrivaled richness.

Iron, the most essential of all, and which enters into the uses of the cabin or the palace, is the leading metal of Missouri. Though yielding in past years to lead, in the values produced, it will yet in the future surpass all the other metallic productions of the State.

The iron mines of Missouri not only contain ores in unexampled quantities, but their ores are even more remarkable for quality than abundance. It is a fact, as gratifying as it is peculiar, that all the more valuable ores of iron known in the world are found in Missouri, and of purity not excelled.

In regard to the quantity of our iron ores, it is idle to submit figures. Our resources are simply inexhaustible.

The Iron Mountain and Pilot Knob are known as the grandest iron features of the continent. But even leaving these wonderful masses of metal entirely out of view, Missouri has mines of iron to last not only herself, but the whole Union, for many generations. So grandly do the Mountain and the Knob loom up, that the lesser objects are almost overlooked; yet, in any other State or country, they would be held in very high estimation. They are only small in comparison with the two greatest mines of the world. And it is a fact worthy of note, that all the principal iron deposits of Missouri are alike in containing the richest and purest varieties of ores ever known.

There are now seven furnaces in the State smelting iron ores with charcoal. The iron produced is of superior excellence, and for some purposes unequaled. Some of the furnace product is converted into wrought iron here at home, but much of it is shipped to distant points, where it is used for purposes requiring the first quality of metal.

Owing to the richness and purity of Missouri ores, charcoal furnaces in the State have yielded from eighteen to twenty tons of pig metal a day, for weeks in succession. This yield has never been equaled by charcoal furnaces in any other part of the world. The statement of this enormous production is scarcely credible, yet the fact is beyond question. But such production has only been possible in Missouri, and it is the most eloquent eulogy that our iron ores could have.

Employment and support are given, directly and indirectly, by the furnaces already in existence, to a very considerable population. If their products were wrought up here at home, as they ought to be, into all the various forms assumed by the iron before it comes to actual use by the consumer, the number of people supported by this interest, working only the products of our present furnaces, would be indefinitely multiplied. The advantages of such ultimate manipulation, to all classes, are not within the scope of estimate, but all men of common sense appreciate them. Difference of opinion may exist as to the protection and encouragement which government, in tariff laws, may rightfully afford to manufacturing industry; but there is only one opinion among well-informed men as to the increase of wealth and power in all countries where industry is diversified and domestic commerce prosperous.

The production of iron is but begun in Missouri. Only a few years ago the Mountain and the Knob were but geological curiosities. It is only a short time since they have been reached by a railroad, or since another railroad has been built near to the Moselle and the Meramec works; and of this brief period four years were the fevered season of tumult and war, unpropitious to industry or enterprise.

A beginning is now only being made in smelting our iron ores with mineral coal. As the germ in the acorn is to the oak of centuries, so are the timid essays in this new industry to the operations and results, alike stupendous, which the early future will witness.

Heretofore, dependent on charcoal, the production of iron in Missouri has been limited, because but a limited supply of that fuel was attainable. But hereafter, using mineral coal, there need be no limit to production but that imposed by the condition of the market, and the market is likely to keep pace with production.

The experiment of reducing Missouri ores with mineral coal is entirely successful. In Indiana, ores from Missouri, smelted with Indiana coal, yield iron of excellent quality, either for the foundry or forge. Equal success is expected at Carondelet and other localities, with Illinois coal.

On the subject of reducing our ores with western mineral coal, there is not the shadow of a doubt in the minds of practical iron men. But only those who know what developments of other industries have attended the making of iron with mineral coal, in other parts of the world, can appreciate the significance of the steps now being taken and the important results to follow.

Coal and iron are of far more value to England than all the gold of Australia is to that colony. The annual value of coal and iron, in Pennsylvania, is much greater than of gold in California. And whether we have gold mines in Missouri or not, is a question of little consequence; for so long as we have our iron ores, with coal accessible in like unlimited quantities, we may command the gold of others.

When John Perry built the first iron furnace beyond Potosi; when Samuel Massey penetrated the wilderness, and placed his furnace and forge at the magnificent fountain of the Meramec; when Chouteau, Harrison & Valle erected furnaces at the Iron mountain, to utilize the geological wonder; when Bogy and his associates ascended to the crown of Pilot Knob, to seize its rich ores for the fires at its base; when all these pioneers of iron were each pursuing his separate enterprise, the Mississippi Valley was being prepared, by added populations and multiplied improvements, for the day when the unmeasured *iron resources* of Missouri should be adequately valued. That day is now dawning. We trust soon to enjoy the full splendor of its risen sun. But that it should have come at all to the present generation, is due to the courageous men who first put their means and energies into the production of iron, and demonstrated the peculiar excellence of our ores; whose productive industry invaded the sublimity of nature and changed our geological curiosities to sources of wealth. For the analysis of the chemist, in test of our ores, they have substituted the potent assay of the charcoal furnace, yielding twenty tons per diem. All honor, therefore, to the pioneers of iron in Missouri!

Likewise, all honor to the men who have carried through our railroads, reaching to some of our great iron mines, and to the neighborhood of others. Heroes in a campaign requiring courage and constancy, their works are monuments for all time.

The Southwest Pacific railroad, ultimately to run for three hundred miles over metalliferous formations, in its course to the present terminus on the Gasconade, passes near the iron works established by Mr. Massey, and now conducted with vigor by Mr. James, and also by the Moselle works of Messrs. Brown & Co. It also runs within short distances of many deposits of iron not yet worked, but regarded as of much value, and from which the ores may be advantageously carried to furnaces in St. Louis, or to meet mineral coal at Franklin or other points, where river or rail may bring it.

But the Iron Mountain railroad is the important highway to which credit must be awarded, not only for promoting the production of iron by charcoal, and for creating a new branch of commerce in the unsmelted ores shipped in large quantities to other States, but also for hastening the day of iron smelting by mineral coal. This road runs to the two greatest iron mines of the world, providing cheap carriage for their stores of wealth, in any quantities that present or future wants may require. No other railroad, in any country, extends to natural objects at once so grand and so valuable. It touches in one group the Elba and Danemora of the western hemisphere; and if never extended beyond the Mountain and Knob, a large and increasing business would pass over it.

When the question of ownership is properly settled, this road may, in a few months, reach the Mississippi at Belmont. We may then expect that numerous charcoal furnaces will be erected in the timbered country on the extended line; and also that the iron ores will be carried to meet mineral coal at the southern end of the road, as well as to Carondelet and other localities at the northern end. The completion of the road will not only tend to the erection of more furnaces, adding vastly to the productions, commerce, and taxable values of the State, but will also cause increased shipments of the unsmelted ores. Establishments in Cincinnati and Pittsburg, which, but a short time ago, trusted to supply themselves with ores from Lake Superior, now acknowledge that their only safe dependence is Missouri. Manufacturers of iron in those cities and in other localities want the ores of Missouri, and if we can deliver them on the river at Bird's Point or Belmont, the cheaper carriage will tend to increase the consumption. Every citizen of the State who pays taxes must desire that all obstacles to the early completion of the road may be removed.

The reduction of our iron ores by mineral coal is a step of progress to be succeeded by others. It is a maternal industry, and others will be born of it. In a short time we shall not be content to produce only iron, but by the Bessemer process we shall convert the products of our furnaces into steel; and in addition to ten thousand other uses of this product, it is not unreasonable to assume that in a few years our railroads will be laid with steel instead of iron rails. To some persons it may seem an extravagant assumption that we shall have steel railroads. But who can set limits to progress? To forbid advancement were as idle as the command of King Canute to the sea. Improvement and advance are constant. It is but fifty years since there have been railroads of any kind for the tread of the locomotive, or the locomotive to tread them. It is only forty years in next October since the first locomotive propelled itself on a railroad in America. A prediction twenty years ago that we should achieve what has since been accomplished would have been much more extravagant than a prediction now that in a few years there will be none but steel rails laid on American roads; and that for thousands of other uses steel will be substituted for iron. A recent statement that steel rails are ordered by Mr. Vanderbilt for a road in New York shows that one sagacious capitalist understands the superior value of superior quality in railroad material. In England experiments indicate that steel will outlast iron rails indefinitely; and they are being manufactured largely. In Pennsylvania one concern alone is putting up works, costing a million, to make rails and locomotive tires of Bessemer steel.

Either the process of Mr. Bessemer or that of Colonel Uchatius, in well-organized works, will produce steel in large quantities at a cost of probably not more than forty per cent. over the cost of iron. As capital increases this increase in the cost of the better article will be but a trifling consideration. Whether we advance to steel rails or not, samples of bar iron from the Laclede rolling mill, wrought from pig iron made at Brazil, Indiana, from Missouri ores, smelted with mineral coal, show the superior quality of iron rails which we may produce. The rail mill at East St. Louis (owned by St. Louis men), where a rail is drawn and trimmed in about seventy seconds, affords evidence that we can put up and operate the proper machinery for re-rolling rails, and justifies the faith that we shall in time have new rails from Missouri iron or steel.

But what a magnificent future for the iron interest of Missouri will open as we shall go on to reduce our ores by the million tons, using the exhaustless mineral coal of Illinois and Missouri, and employing all the most improved machinery and all the most advanced processes to attain the utmost perfection in the products of ores, which are themselves of unrivaled richness and purity!

Imagination can hardly paint in colors too gay this probable future. The change from charcoal to mineral coal in reducing the iron ores of our State means a product of good quality, and so cheap as to hold the market; and the result seems inevitable that the center of the iron trade of this great valley must be Missouri. The magnitude of that trade in coming years can only be measured by those who can measure the future development of other industries in the Mississippi Valley and west of us to the ocean.

St. Louis will wear the iron crown of the continent. She will forge links of steel to bind her tributary realms. Her iron works will be a noted part of the brilliant successes which are in the early future to adorn the history of a city, whose taxable property is already equal to one-third of the whole value of the State. Commerce, naturally hers, but in past years diverted by inimical agencies North, and impaired by public calamities South, will be restored with added millions. The public voice demands of Congress that the great inclined plane from St. Paul, as well as from Sioux City, to the Gulf, shall be relieved of obstruction, and made to afford a cheap outlet to the sea. Large regions to the north and northwest, brought to production by energy and labor unconscious of impediments, are to find their emporium in our metropolis. Capital, adverse to us, has been eager to span the continent through passes where winter is supreme; but the elements are omnipotent, and the railroad to the Pacific, which snow will never obstruct, is in the end to bring us the commerce of the Indies on rails made from the ores of Missouri.

LEAD.

Throughout the metalliferous region of Missouri (20,000 square miles in extent) the ores of the useful metals, particularly of lead, are found; in some localities not in quantity to reward mining enterprise, but in many others in such abundance as to invite exploitation on the most liberal scale.

This extent of metallic area is due to the geological formation of a large portion of the southern half of the State. The magnesian limestones of the lower Silurian system are the principal rocks of this region. They are lead-bearing rocks, and deposits are found, more or less rich, where these rocks prevail.

In some considerable districts, the limestones are covered by sandstones and other formations, in which ores of any kind are rarely found. In other districts, the metalliferous rocks are on or near the surface, and ores are abundant, especially of lead. These rocks have been so slightly disturbed, since their creation, by upheaval or subsidence, that where they do not appear on the surface it is in general not difficult to judge how far they are beneath; and in but few if any parts of the region spoken of, do they lie too deep to be reached by the miner.

It is not believed that there is in any other part of the world so large an area of lead-bearing rocks, so uniformly disposed, so regular in occurrence, so readily identified, and on a scale so grand.

Sulphuret of lead, or galena, is the principal ore. It occurs in horizontal deposits; in "gash veins;" in modes composed of both these; in vugs and pockets, and also in lodes or true veins. The greatest product has been from the horizontal deposits and gash veins; but in several places lodes or true veins have been worked which are believed to be inexhaustible. In the southern part of Franklin county there are several lodes in the permanence and value of which the utmost confidence is reposed, not only by professional geologists, but also by the practical miners.

Lead has been a product of Missouri from an early period. Her mines have been known since the day of John Law, under whose auspices adventurers came came from France to secure the fortunes promised in the "Mississippi scheme." Mining and smelting have for many years employed a large force of men, and the exports of lead product have brought large aggregate returns. The production goes on quietly, but steadily, in many parts of the metallic region, and it might be indefinitely increased.

The population engaged in lead production has made up a considerable market for Missouri farmers. In past years these consumers have generally been content with "bread and meat," and but little else was within reach. But modes of life are readily modified, with changing circumstances. As the productions of agriculture are diversified, taste and appetite are likewise diversified; and when the nourishing vegetables and luscious fruits of horticulture are presented they are at once the objects of desire. As to the grape, none who know the vicissitudes of the miner's toil—at times so depressing, when the "mineral pinches out," and again so exhilarating, when the "prospect is rich"—can doubt that he will always relish a bumper of native wine.

Our lead deposits are also exercising, indirectly, an influence in favor of agricultural and horticultural progress. Observing men, first attracted to Missouri by her mineral fame, learn by inspection the value of her soil and climate for fruit culture, as well as for general farming. Some become residents, to sow and to reap, to grow live stock, or to plant orchards and vineyards; and those who do not themselves settle among us become vouchers to others. Many, like the spies of Canaan, carry home with them bunches of grapes to show the fatness of the land.

Some of our own people, too, first tempted to the lead regions by the seductive mineral, may be expected to engage in the culture of vines and fruits on the surface, while the pit and gallery penetrate to the metallic treasures beneath. By analysis of the soils, Professor Swallow has shown that millions of acres in the lead regions of Missouri have the elements to nourish the vine. The same regions are also the home of the peach, which, since the first settlement of the country, has in some localities never failed, except in 1864, when the temperature went down to 23 degrees below zero.

Fortunate, indeed, is Missouri in possessing her millions of acres, where, in addition to the usual farm products, the delicious peach is a certain crop; where the apple and the pear excel in size and flavor; where the grape yields a juice, not only for wine of the highest order, but with properties to furnish, by distillation, brandies of better quality than the imported article; and where the farmer may have his grains and fruits on the surface and his mineral riches beneath. And more fortunate will she be when her lead interests shall be fully developed; and when her hills, like so many already in the lead regions of Washington and Jefferson counties, shall be tinted with the carmine of the peach and the purple of the grape; and when her convivial boards shall be supplied with those innocent but exhilarating beverages for the production of which nature has provided the soil and climate.

COPPER.

The discovery of native copper, in veins, on the shores of Lake Superior, depreciated other localities where only the ores of copper are found. It was supposed that to take the native metal from the mines must be vastly more profitable than to dig the ores. This was a mistake; first, because the products of native copper veins must be smelted, as well as the ores of copper; and second, because mines bearing copper ores are worked at less cost, as a general rule, than mines of native metal.

But persons not informed in regard to the nature of mineral veins, easily believed that mines of ores could not be so valuable as mines of metal, and capital was not so ready to seek veins of ore as those of native copper. Consequently, no large expenditures, like those required to develop the Lake Superior mines, have been applied to the copper "prospects" of Missouri. With few exceptions, the citizens of the State have paid no attention to the subject; and those who have adventured in the mines have done so at a loss, from deficiency of mining knowledge as well as capital.

It is, however, true, that if there be any lodes or true veins of copper in Missouri, of strength sufficient to warrant exploitation, they will prove to be of greater value than the lodes of native copper for which the Lake Superior district has become so celebrated; not only because we have a milder climate and greater facilities for surface operations, but also because the ores can be worked to more advantage. There is less blasting required in our veins; no costly underground work to cut up the ores, as with the "masses" of native copper, and less expense in dressing the ores when brought to the surface.

But, whether we have a single copper vein in Missouri worth working, is only a matter of faith and hope. In all declamation on the mineral resources of Missouri, copper is a topic; and it is a popular assumption that the State is "rich in copper." But the fact is only probable, and has not yet been proved.

We cannot, therefore, say of this important metal, as we may of iron and lead, that it has not only done the State much service in export values, but has more or less aided the advance of agriculture and commerce. No appreciable service to the farms or the railroads has yet been rendered by copper in Missouri; nor has it been sensibly felt in the commerce or manufactures of the State.

Copper ores have been mined in many localities, and many thousands of dollars' worth of smelted copper has been sent to market from Missouri. The ores, like our ores of iron and lead, have been remarkable for purity. No deleterious substances have interfered with their reduction in the furnace. By rude processes metal has been produced direct from the ore that came within five per cent. of absolute purity. But no copper mine has yet been opened in Missouri, as a copper mine *must* be opened, in order to be successful; and at the present time it is believed there is no mine worked for copper in the State.

Yet those who are best informed in regard to copper mines elsewhere, and who have studied most carefully the metallic geology of Missouri, have strong faith in the existence of lodes or true veins of copper. They know, too, that all the practical miners from Cornwall who have ever wrought in our copper mines, have uniformly recognized the evidences of true veins, and entertained a firm belief in their value.

Actual workings, however—the only reliable test—have only proved that we have copper "prospects" worthy of exploration, and that efforts to properly examine them ought to be made—not by companies gotten up for mere stock speculations, but by associations to work in good faith, and that will go down at least fifty fathoms on some of our veins; which, on the surface, are styled by the Cornish miners the "backs of Champion lodes." It would seem that a source of wealth, not only possible, but in a high degree probable, should not be neglected when the cost of a single grand "dinner" would suffice to explore a mine.

An opinion was advanced, some fifteen years ago, and is held in some quarters, by those who have given much attention to the subject, that many of our most valued IRON MINES are also, probably, COPPER MINES ON A GRAND SCALE. It is supposed that the millions of tons of oxides and hydrates of iron, constituting the rich ores above the water level, and whose value for iron production is beyond computation, are only masses of "gossan" on the "backs" of copper lodes; the "chapeau de fer" of the French, and the "iron hat" of the German miner; and that the lodes or veins extend downward indefinitely. It is claimed that this opinion, or theory, has been deduced from facts and experiences in copper mines of Missouri, already partially opened.

If this theory be correct, the iron hills at the head of the Meramec, at Salem, near Stanton, and in many other localities, are not only iron mines of great value on the surface, but are lodes or true veins of copper below, and will some day yield enormous wealth. The Iron mountain, Pilot Knob, and Shepherd mountain are similar formations, and are supposed, in some quarters, to be as worthy of admiration for their copper as for their iron ores.

It is like a vagary of enthusiasm to regard our great iron deposits as also mines of copper. Credence will be slowly given to the suggestion. But our geological systems, though like, are not identical with, any others; and if it be true that we have exhaustless lodes of copper. "backed" by unrivaled mines of iron, the Creator has been as generous in metals south of the Missouri river as in the priceless deposits of coal underlying the fertile soil in the northern half of the State; and we may expect that the future of our copper interest, like the well-assured future of iron, will be magnificent.

We may expect that copper will concentrate large capitals in numerous localities; will employ large numbers of miners; will sustain a large population in auxiliary pursuits; and will promote consumption, in large quantities, of the products of the soil. Commerce will throb in unison with these pulsations of other interests. All creative and productive industries are akin, and the prosperity of each is a joy to the family.

OTHER MINERALS, ETC.

Tin ores have recently become an object of attention in Missouri. This metal is not—like iron, lead, and copper—generally diffused throughout the globe. Two localities, Cornwall and the Malayan Islands, furnish nearly the whole supply of the world. Should our State be proved to possess the ores of tin in workable quantities, they will be of great value, not only for home supply of this metal, which enters into so many uses, but also for export. The ores are said to exist in large quantities in a region of the State where the older rocks come to the surface. The geological conditions do not forbid the hope that the enterprising citizens who are now engaged in developing the veins may be successful. Those enlisted in the enterprise as capitalists or miners all entertain the utmost confidence in the value of the mine.

Cobalt and nickel may in time become important exports, or be used in the arts at home. The demand for the former is not very large, but the latter is day by day entering into additional uses. These metals are found at Mine la Motte, in a mineral district of peculiar geological features, and the mode of their occurrence suggests a continued supply. In the same region gold is reported to have been discovered in limited quantities, but the opinion is not prevalent that Missouri is likely to become a gold-producing State. It is generally believed that to procure all the gold she needs it is only necessary to develop her other interests.

Silver is associated with some of the ores of lead, but has not been found in sufficient quantities to pay for separation. Zinc exists in numerous localities, and may, in some, pay for working. Manganese is known in several mines, and will be of value in other arts as well as in the Bessemer process of converting iron into steel.

Natural paints are abundant, of several varieties, and are already objects of commerce. Barytes, until of late regarded as of no practical value, is now an article of manufacture and export. The sands for glass and the clays for fire-brick and crucibles, as well as for pottery, are not only of rare quality, but are in active demand. Our porcelain clay is suited for the finest wares.

But all other mineral interests, however important in detail, or large in their aggregate, are subordinate in value to the coal, the iron, the lead, and possibly the copper, zinc, and tin of the State. The first of these is the motive power which carries forward other industries; the others are the chief metals in the service of mankind. A commonwealth possessing these minerals in abundance, or only the first three of them, is entitled to rank as one of the leading mineral districts of the globe—and such is Missouri; our own Missouri, which, at the Paris Exposition, presented an array of the useful minerals equal, if not superior, to the display of any other American State.

Thus, imperfectly and feeble, but without boast or exaggeration, a candid review has been presented of the mineral wealth of the State. No argument is needed to establish that if we prosecute the development of those interests, all others, agricultural, mechanical, and commercial, must advance with equal step.

By her legislation, Missouri invites the immigrant. Her press and her active men second the invitation. Her railroads, her schools, her churches, and her social life give it value. To provide the settler a home, the United States donate freely their unsold lands.

Peace reigns; law presides; industry, with busy hands, creates wealth; inventive genius multiplies the productive powers. Commerce takes our products and brings us the merchandise of all climes.

Science and literature erect their temples in our magnificent domain.

To the banquet that nature has spread and art has garnished, we bid the coming thousands welcome.

Fellow-citizens, facts and not fables have been presented here, and the inferences are not difficult of discovery.

One moral is, that a State so rich in minerals should complete her geological survey, or at least publish the data already collected.

Another moral is, that our mineral resources are such as to justify the establishment of a school of mines, in which geology, mineralogy, chemistry, and mining engineering shall be taught.

And yet another moral is, that those who shape the legislation of Missouri and execute her laws are unequal to their high mission if they fail to realize how great an empire is intrusted to their care. If small ambitions, local jealousies, objects of temporary interest, or inflamed passion, govern their action, rather than the lofty impulses and enlarged views of statesmen, the commonwealth is defrauded of the service which her interests need, the honor of her servants is impaired, and history will be forced to record the petty contests of partisans, when her scroll should be illuminated with the achievements of enlightened patriots.

PROGRESS OF AGRICULTURE IN PRUSSIA.

BY EMILE DE LAVELEYE.

[Translated from "Revue des deux Mondes," by Professor Spencer Smith.]

It is well known that agriculture has made such rapid progress in Prussia within the last few years that, though naturally little favored by nature, it is now almost the equal of France, with its beautiful climate and intelligent and active population. What are the causes which have brought about this result? Some of them we now propose to examine. The first and the principal is the universal education of the people. Although knowledge of natural and economical laws has worked the multiplication of products, this operation is always slow and almost insensible.

In the intellectual field we sow to-day, but the harvest comes only after patiently waiting twenty or thirty years. It is not sufficient that the farmer knows how to read and write; it is necessary that he should read, that he should understand what he reads, and that he should profit by it.

In the United States whatever discoveries or inventions are made, in two or three years everybody is profiting by them. Last year the various factories sold over 70,000 mowing machines. How many are there in France, or even on the European continent? These simple figures offer a subject for careful reflection. It is not wonderful that a nation which seizes with ardor upon any means of abridging labor and rendering it more productive promises to become, in less than one generation, the richest and most powerful State on the globe.

Prussia, hardly escaped from the shackles of the *ancien regime* and its morbid influences, does not progress so fast, it is true, as the vigorous American democracy, but she has taken measures to make up for lost time. Not contented with opening a school in every village and hamlet, and requiring every child to attend them, she has organized a complete system of agricultural education for the different classes who are expected to direct the labors of the field. At the head, and representing the higher grade of instruction, we find four royal agricultural colleges: those of Eldena, of Proskau, of Poppelsdorf, and of Waldau; besides, a very popular agricultural institution is attached to the University of Halle, and another to that of Berlin. These institutions are established for the benefit of young men of moderate fortunes, who are desirous of learning how to manage an estate either as stewards or proprietors. The institution at Eldena is perhaps the most interesting to visit, and it may be worth while to describe its organization.

The school of Eldena is established in a large building, formerly a convent of the order "de Citeaux," which belongs to the University of Griefswald. This university is one of the greatest landed proprietors of Pomerania. It possesses an immense patrimony of 55,000 *morgen* (34,650 acres), containing sixteen manors and eighteen villages peopled with more than 7000 inhabitants. The situation of the school has been well selected; it is situated in the village of Eldena, a few miles from the small city of Griefswald, on the shore which forms the Isle of Rugen. Eight hundred and forty-one acres form the experimental farm, bounded on one side by a beautiful forest of beeches laid out as a park and promenade. The ruins of the ancient chapel on the bank of the sea give a picturesque aspect to the landscape.

The farm keeps twenty-six work horses, seventeen oxen, seventy stock cattle, and twelve hundred sheep, so that the pupils may be initiated in all the details of an experimental farm. A brewery, brickyard, and a factory of drain tile are attached. The adjoining forest serves as an experimental field for lessons in sylviculture. The farm is conducted in such a manner as to return a profit—the only way to give practical instruction. Nothing can be worse than pretended model farms which teach how to squander money, and are subjects of ridicule to the country people, who justly look to pecuniary results. Of the net revenue a part, 5000 thalers, serves as a fund set apart for the benefit of the school; the rest is used in improving the place.

The complete course requires two years; it comprehends political and rural economy founded upon statistics, agriculture, arboriculture, and sylviculture, and includes, in technology, the manufacture of sugar, beer, brick, and drain tile; in the natural sciences, mineralogy, geology, botany, and chemistry, with experiments and excursions; and finally, mathematics, including trigonometry, surveying, mechanics, the veterinary art, rural law, history of the country, and constitutional rights.

Excursions are made into such places as offer the best means of perfectly studying this programme, which, as will be seen, is very extensive, and is capable of expanding the mind of a young man as much as studying Latin. It will not only teach him how to conduct an improvement, but will open his eyes to the beauties of rural occupations and the wonderful laws of nature. Very little education will suffice for the working man, provided he is to be taught only what will be of use to him in his trade. The German is a true pedagogue; he is born a professor. In times past German science was abstract, pedantic, crowded with formulas; now it is instinct with life, and excels all in ennobling the humblest works, by exhibiting the theory upon which they are founded.

In order to be admitted to the school of Eldena, the pupil must have passed through the usual academic studies. The entire course costs 390 francs ($78) for the two years, and is finished by an examination by the faculty, and a diploma is given if the pupil is deemed worthy. The students live in private rooms in the town like the students of the University. The Germans disapprove entirely of students living in commons. They wish that a young man should early learn to govern himself and to enjoy the liberty to which he will sooner or later arrive. The city of Griefswald, though it has a population of only 16,000, is neither poor nor dull. During the long winter evenings, upon the dreary banks of the Baltic, families in comfortable circumstances give little parties, where they have music and dancing, the whole conducted with a simplicity which characterizes the inhabitants of the countries beyond the Rhine. The pupils of the school of agriculture are invited, as well as the students of the University. They thus form relations which are useful to them in after life, because it teaches them how to render a country life pleasant and agreeable.

Besides these four colleges there are nineteen schools of agriculture in the different provinces. They count, in all, about 232 pupils, and only cost the state a subsidy of 21,158 thalers, being about forty-seven dollars per scholar, which is very cheap; but the schools are established upon a very economical scale. They are usually kept by some large farmer aided by two or three masters, the veterinary surgeon, the schoolmaster, or the chemist of the neighborhood. The design is to train up good managers who can work themselves, but with more intelligence than those who have not been thus educated.

The oldest of these institutions is that of Riesenrodt, which dates from 1845. The most recently established is that of Polko, in 1863. Besides these, there are a great many schools of a higher grade, and some for specialties. A school for the proper management of forests is established at Neustadt, and attended by a large number of pupils supported by the government. Indeed, until lately, Germany was the only country where the proper care of forests was studied, and where the word sylviculture had any meaning. The veterinary art has two schools, one at Berlin, the other at Munster. Polsdam possesses a very superior school of kitchen gardening and arboriculture, which exercises a most excellent influence. The taste for English gardens, for rare flowers, for foreign trees, and good fruits, is singularly prevalent, and contributes to give a charm to the country. In a single year this cold Prussia has exported 3000 kilogrammes (66,165 pounds) of ananas to the banks of the Bosphorus, to be consumed at Constantinople. There are in the older provinces 134 schools for orchardists, of which twenty-six are in Siberia. In that of Posen the masters of the schools give instruction in this art, and the humblest laborers may take advantage of it in planting fruit trees around his cottage. As the peasant is not always inclined to take the trouble to learn, they in a manner force him to, in a way best calculated to awaken his understanding. The agricultural associations keep a corps of itinerant instructors in agriculture; each instructor goes from village to village holding "institutes," and there he explains the methods, and practices the most necessary to be adopted. He cites the examples of those who have succeeded best, and invites his hearers to visit those model farms. These traveling apostles of rural economy do not preach in the desert, for the central commission show the progress which is due to their labors. They have contributed above all to a knowledge of the proper rotation of crops, and the preservation of manure; and now, in some districts, they cover the compost heaps with a roof—an excellent practice, which renders manure much more valuable. Among the itinerant professors M. G——, in the north, and M. Schneider, in the south, have achieved the greatest success.

Another institution, not less interesting, is that of stations of chemical experiments. In the country of Liebig we expect some good from the results of organic chemistry. Agriculture is an art, the results of which depend upon a series of chemical operations, which, until lately, have escaped the control of man. Forces the most mysterious often cause the ruin of the best conducted enterprise. In the mechanic arts it is not so; certain preparations always give the same results. The powers of nature are under control; they obey submissively whoever evokes them. Why should it not be the same in agriculture? It ought to be sufficient to analyze the soil and manure, to lead to known chemical reactions which will give certain and invariable results in the harvest. Behold the brilliant hope which had been indulged in, and which, not being realized, has produced discouragement. Nevertheless, chemistry has been of undoubted service to agriculture, and it is to give the latest information on the subject that they have established experimental stations. In seven different places—at Salzmunde, at Regenwalde Lauersfort, at Schmiegel, at

Insterburg, at Ida-Marienhutte, at Dahme—chemists are required to perform all the experiments which can be of benefit to cultivators of the soil. To determine the composition of the land; to indicate the relative value and composition of commercial manures; to put the public on their guard against humbugs, of which they are too often the victims; to study the effects and value of different kinds of feed for fattening cattle—such are some of the questions which are submitted to them. It is easy to understand what great advantage these men of science possess in a country where the people desire to introduce a rational cultivation, and where they like to have some system in their agriculture. Nowhere, it is said, is the study of chemistry more advanced than in Germany. Nowhere, certainly, is this study more widely spread. Great numbers of young men attend the lectures of masters who have acquired reputation, and who work with their pupils in the laboratory. These men are often content with a very small salary, and render the greatest service to agriculture and the industrial arts. In order to encourage improvement, and to generalize the best methods of agriculture, associations are formed In Prussia there were, in 1864, 519, with 64,000 members, and a treasury containing 141,000 thalers. Within the last ten years this number of members has been increased by a third, and the revenue doubled. These societies have frequently a regular place of meeting, and a library of rural literature. After the example of the state, they have formed a kind of savings bank, with a capital of 600,000 francs. They organized fairs: in 1865, 102. Prizes are distributed for the best essays upon given subjects; and at their meetings they frequently have discussions upon the topics of the day. Those topics, which they have made the especial subjects of study the past year, are usually most interesting. They give their attention to examining the theory of Liebig upon the exhaustion of soils, the comparative profits of stock-raising and cropping, and which is the more profitable, sheep or cows. These societies do an immense amount of good. They diffuse life and energy, and take the initiative in new methods. There are also special societies, such as sylviculturists, apiarians, distillers, and sugar refiners, who meet from time to time to communicate to each other their observations, and advance their interests. The state never interferes with them in any manner whatever. It gives its countenance only to societies called "societies of improvement," because the aid of the state is indispensable. When a great enterprise is to be undertaken, such as draining a swamp, planting a forest, or irrigation on a large scale, those who are interested may become an incorporated body, and the decisions of the majority rule. It is a kind of dispossession for the public good, and those who oppose it are often made rich in spite of themselves, like the system of dikes and water-rights in Flanders. The province or state often lends them money at a low rate of interest and authorizes them to employ engineers. In 1865, 102 of these societies operated over an extent of 450,000 hectares (111,150,000 acres).

The budget of expenses incurred for agricultural purposes, improvement of stock, and the schools does not amount, after the receipts are deducted, to more than 3,140,000 francs, and that for the four principal schools does not amount to more than 92,000 francs. Under the Ministers of Agriculture, there is organized a central commission of which the secretary is the well-known agricultural writer, M. C. von Salviati. In 1862 the repairs of buildings and furnishing this department did not cost more than 12,000 thalers. This shows with what scrupulous economy this department is conducted.

We now see that it is the diffusion of instruction and scientific ideas which is the cause cf the recent progress of agriculture in Prussia. It must be remembered, however, that the wealthy classes have lent their aid, and government has thrown no obstacles in the way. Here are two points about which we wish to say a few words. In Prussia the cities are neither beautiful nor gay. The student there finds everything to satisfy his taste; the man of pleasure only *ennui*. Happy the country where the cities are unattractive; they drive the rich to the country, and the country profits by it. There is no country where the cities are duller than in England, and in no country is agriculture more prosperous. Until within the last few years the Prussian landlord was always poor, because the land produced so little. He resided the greater part of the year on his estate, off which he endeavored to increase the revenue by expending his savings upon it, and giving it his attention. In winter, when he retired from the fields, he contented himself with very modest apartments, where he lived economically, but liked to have his summer residence as comfortable as his means would permit. This is why we meet with so many elegant country residences in almost all the provinces, and for which the German architects have adopted a mixed style, very graceful in itself and harmonizing well with the surrounding landscape. Nearly all the land owners cultivate their own estates; except for detached portions, renting is the exception. They are, therefore, retained in the country by the necessity of overseeing their own interests; for nothing more imperiously demands the eye of a master than rural industry. It is true they are aided by a class of employes which is not found in any other country. They are educated young men, belonging to families holding a good position in society, often just leaving an agricultural college, who remain for sometime on some large estate to initiate themselves in the practical direction of their own. This novitiate is an ancient custom still preserved in many trades. Thus, frequently the son of a rich hotel-keeper will not hesitate to enter another hotel as butler or waiter (*kellner*), to be initiated in all the details of the service over which he may some day have to preside. When any one visits the farms (*Rittergutter*), he is astonished to see as superintendent the son of a banker, a baron, or a rich land owner. These young people drive a cart or guide the plow. At noon they return, groom their horses, and then go and dress themselves and dine at the owner's table, to whom they are not inferior, either in education, birth, or manners. After their meal they resume their working dress, and return, without any false shame, to their rustic occupation. Thus we find in feudal Prussia a trait of manners suited to the democratic society of the United States, and which hereafter will become general. In France, and in England, especially, a man of the upper class would feel his dignity compromised by performing the work of a farm laborer. This contempt for manual labor, this unrighteous prejudice, remnant of ancient times, still infects, whatever may be said to the contrary, our modern society. In words we sing the praises of labor, the creator of capital, when in fact it is the capitalist and not the laborer whom we respect. In proportion as the laboring classes are elevated will these things be changed. The time will come when the laboring man and the man of science will be the same individual. It is singular that this should be in Prussia—this country of caste and aristocracy—that here we should find the type of producer such as he will be in the future. These young men lighten very much the tasks of the working proprietors, who are therefore not so closely confined to the fields they cultivate; they can travel, they can go to the watering places, or occupy themselves with any other business, certain that in their absence their affairs will not suffer. It is owing to this presence of the proprietors and his educated employes that the spirit of progress has penetrated into the west. But for this, the eastern half of Prussia would be only a continuation of Russia. In many countries the central power has crippled the progress of agriculture by draining it of the money which is so essential to its improvement. Prussia has had the good fortune to have neither colonies which drain nor a capital which devours.

Besides Java, which is a vast coffee plantation, of which Holland owns the soil, and which gives up a part of its products as an equivafor rent, every colony is an expense to the country, which thinks itself happy in possessing a part of its capital and its population. Where capital and men increase with such marvellous rapidity as in England, the evil is not so great; but as much cannot be said of countries where there is plenty of room for developing the resources of the nation. Prussia has expended her savings upon her own territory. She has colonized her sands and her marshes. The fertility which she has communicated to the soil, the factories which she has established, the cattle which she raises, all contribute to her wealth; it is a definite gain of which she cannot be deprived by maratime losses, as may be the case with the distant colonies. She desires now, it is said, to possess and maintain a strong navy. This is one of the vain ideas borrowed from the erroneous views of the *ancien regime.* Political economy has shown its emptiness; and England, which understands its teachings, is laboring patiently to free herself of the cost and responsibility which her colonies impose upon her. Suppose that Prussia had possessed for thirty years such a colony as Algiers. What more beautiful colony could she desire; nevertheless, it would have cost her, for fleets and armies, and administration 100 millions a year, that is to say, as much as would be necessary to reduce 988,000 acres annually, or 29,652,000 acres since its conquest. May she never aspire, then, to those brilliant possessions beyond the sea, and those ironclad vessels which are necessary to defend them. Such things do not render a people thrifty and happy.

Berlin is often reproached with having only monuments of brick and no sewers. Would it be better to follow the example of Paris, which now dazzles the world? That city is an exemplification of the saying of Bastiat: "What you see and what you don't see. What you see are interminable boulevards, rows of palaces—those edifices of cut stone, where their golden ornaments sparkle in the rays of the sun. What you do not see is the country depopulated, and where money fails to give value to fertile land." In one of those terrible philippics in which the "Friend of Man" abounds, Mirabeau thunders against the increase of the capital. "A capital," says he, "is as necessary to the state as the head to the body; but if the head grows too large, so that all the blood tends to it, the body becomes apopletic, and the whole perishes. The increase of the capital ought to be taken as an evidence of abundance in the state, very much as a view through a magnifying glass is of the size of the object. All the money goes to Paris, and man follows the metal very much as a fish follows the current of the stream. On this account the prodigious inflation of this city is the real cause of the feebleness of the country." If the irascible and witty Marquis spoke thus in 1792, what would he say now? Now, when railroads favor in so high a degree the concentration of population in the great cities, it is a crime of high treason against economy to accelerate this movement by enormous expenditures, to which the entire nation must contribute. The money which a single theater often costs would be sufficient to pay for all the buildings belonging to all the primary schools in France. Up to this time Prussia has not committed the mistake of withdrawing capital and men from the country, which is the true source of wealth. On the contrary, by the excellent organization of primary schools, by institutions of all kinds, she has spread throughout the provinces a taste for economical improvements and the intelligence necessary to carry them out; but she must be on her guard against chimerical schemes and vain ambition.

All Europe needs peace, and Prussia not less than the other nations. It is owing to the fifty years of peace which she alone has enjoyed that she has been able to realize the progress we have described. She would suffer more than any other country by war, because, being naturally poor, the capital carefully accumulated by saving would very soon melt away in the event of a European conflict. The struggle of last summer lasted only six weeks, yet the trouble and misery which it caused still remain. The states newly annexed must suffer for the honor of being incorporated into the monarchy of Frederick II. In order that they may be resigned to it they must enjoy great material prosperity, which only the certainty of peace can render possible, and which can alone lighten the burdens of the new contribution and the military service obligatory upon all. The position of Prussia is taken —may she renounce the awkward and foolish attempt to keep in subjection, in spite of themselves, millions of people of another race. May she avoid wounding the sentiments of justice in Europe, and thus win the respect of neighboring nations for legitimate rights. She will extend her influence not by conquest, but by a shining example of free institutions, scientific activity, and literary glory; by a good administration, fostering the development of manufactures and agriculture; and may France meditate upon this wonderful success without malevolence or envy, because she will be the first to profit by it.

AGRICULTURE.

Address Delivered at the Huron County Fair, Oct. 4, 1867.

BY JOHN H. KLIPPART.

Agriculture is the basis of all civilization. If we read the history of the world carefully and attentively we will find that those nations who directed their attention most largely to agriculture became the most civilized—in a word, those nations that were good agriculturists possessed an eminent degree of civilization, while those without agriculture remained barbarous. Egypt is referred to by historians as the cradle of civilization. Why? Were the Egyptians a race of people possessing a higher degree of intellectual ability than other races? If so, then new races must have been created since their day; and we certainly have no record of any such occurrence. But the Egyptians possessed the invaluable, inexhaustible river Nile, which annually overflowed its banks, and by this means fertilized their fields, and rendered agriculture very simple—its practice very productive in results. Because it was simple, and rewarded the laborer's toil with granaries which supplied the then known world, the Egyptians attracted to themselves the wisest and best of mankind, and laid a permanent foundation for commerce. This commerce in its turn introduced and developed many of the mechanical arts, which latter were the basis of many of the sciences. From Egypt, as from a common center, radiates—in all directions—the elemental rays of civilization, science, arts, commerce, and agriculture. Wherever these sciences and arts were introduced, unaccompanied by agriculture, they were soon lost; but on the other hand, wherever they were accompanied by agriculture proper, they flourished—developed the intellectual abilities of the nations among whom they were introduced, and, in a word, civilized them.

There is an intimate connection between agriculture and the mechanic arts, and the one cannot flourish unaided and unassisted by the other. So long as Greece and Rome gave a due share of attention to these branches of productive industry, so long did they flourish; so long also were the arts esteemed, and developed to the greatest degree of excellence of which these nations at that time were susceptible, and their development of the sciences astonished the world. The success, growth and development of these nations were much more intimately connected with agriculture than even they themselves supposed. From the moment that agriculture was entirely confided to their slaves, from that moment did the decay and decline of those empires commence. Greece passed through many severe ordeals under Lycurgus and other rulers, and yet flourished, because her agriculture had enlisted in its behalf the best brains and most skillful hands in Greece. After the death of Alexander, she rapidly declined, because agriculture no longer received that attention which was aforetime bestowed on it. When the Romans retained their prisoners of war as slaves, and intrusted the agriculture of the empire to their ignorant and unskilled hands, her decay and downfall were fully assured. So long as German freemen tilled the soil they owned, all Germany flourished, but when the soil was intrusted to the compulsive labor of the slave, then a cimmerian darkness settled over the land, and it was only when the proprietor himself again followed the plow tail that there was a revival of letter, and among the fruits of the latter was the further step in civilization, the REFORMATION. To-day Germany has enlisted her best minds and most skillful hands in the pursuit of agriculture and the application to it of all the treasures of art and science as yet known, and now the agriculture of Germany occupies the front rank in the world, and the time will not soon come when it will be doubted whether Thaer, Liebig, Mulder, Hoffman, Stoeckhardt, Emil Wolff, and Gronven were myths, or real beings, as many have doubted the existence of King Arthur of England.

The government of any country so far as its prosperity is concerned is a secondary matter; but its agriculture is of primary and the very highest and greatest importance. Under the most tyrannic and severe governments Egypt maintained a position challenging a respectful consideration from other nations; she maintained her position so long as she devoted great attention to agriculture; but the very moment she neglected her agriculture and relied upon her other resources, the black waves of ignorance, and yet blacker ones of degradation, rolled over her, and she was nearly swept into oblivion. In Germany during the feudal ages—and feudality was perhaps the mildest form of a tyrannic government—agriculture was neglected and the empire resolved itself into almost countless petty governments, nominally an empire and ruled by courtesy by an emperor, but in reality governed by a hundred petty tyrants. When the land was divided into small parcels, and the owner cultivated it with his own hands, then agriculture again flourished, and Germany became one of the most powerful governments on the face of the globe. The position of Germany in the sisterhood of nations, her intelligence, her wonderful progress in arts and sciences, is due in a much greater degree to the perfection of her agriculture than to any other cause whatever. Sweep away her agriculture, and tyranny, anarchy, degradation, dissolution and oblivion await her. In France a failure of the crops always inaugurates a revolution; from this we can see how government is dependent upon successful agriculture, while agriculture is by no means dependent upon government.

To me, for one, it is very clear that progress in agriculture cannot be made without intelligence; but I must not be understood as confounding intelligence with "book learning." I have known persons who possessed rather more than an average share of intelligence, and had at the same time very little book learning; while some of the greatest "book worms" that I ever knew had comparatively very little intelligence. Book learning is simply an aid to intelligence, while intelligence itself is knowledge, observation, experience, a ready comprehension. When we are taught how, what, when, and where to observe—when we are taught how to profit by experience—when we are taught how to connect what we have observed with what we have experienced, so as to furnish us with a certain and unerring guide for future usefulness, then, and not till then, have we become intelligent.

The first element of progress in agriculture is observation; and yet it is a singular fact that of all classes of the industrial nations the agriculturists of this nation have profited less by observation than any other class; and hence it is that so little progress has been made by them; hence, too, so many experiments attempted by them will not bear repetition. They have observed a part, but not the whole; and the part isolated is of no more real value than if none at all had been made. In illustration of this we may refer to the very common fact that one man applies gypsum or plaster of Paris to his crop and obtains an extraordinary yield; another sees the crops and learns that plaster has been used, and straightway applies plaster to his crop, but with no apparent beneficial result. He should have observed the kind of soil, its mechanical condition, and should have inquired into the previous culture and rotation of crops. Like causes always produce like results under the same circumstances, but unlike causes under dissimilar circumstances cannot produce the same results.

Now, how shall the Ohio farmer become an intelligent observer? You will all admit that more progress has been made in the past twenty-five years than in the preceding twenty-five. Within the last twenty-five years county agricultural societies and the State agricultural society have been called into existence. The county societies have brought agriculturists together, where they could compare with the object before them the products of the several systems of management and procedure. The superior product attracted their attention because it was a physical thing which they could see and feel, and therefore made a stronger and deeper impression on their minds than if they had received the account at second hand. Year after year improved, and new agricultural implements were presented at these annual exhibitions; the practicability of the adoption to attain the end for which they were constructed, addressed itself to the eye and the judgment, and gradually the severer labors of the farm were transferred from human bone and muscle to the iron and wood of the agricultural machine. These agricultural exhibitions at State and county fairs have accomplished a purpose or attained an object in twenty five years that agricultural newspapers or agricultual books would not have accomplished in a century, because they have presented the improvement in no speculative manner, in no learned and technical essay, or elegant discourse, but have simply presented the improvement to the eye and through it addressed the understanding. The farmer in Ohio is not a reading man, and what little he does read is either news of the day, politics, or religion; and not one in one hundred reads the current literature of agriculture as a physician reads the literature of his profession, or as the lawyer reads that of his. There are in Ohio at least 400,000 farmers, and but a single agricultural paper, which in its palmiest day had less than 10,000 subscribers, or less than one subscriber among every forty farmers. On the other hand there are 230 political and religious newspapers in the State. Among these is the Cincinnati Gazette, which has a weekly circulation of nearly 50,000, a daily circulation of nearly half that amount, and a semi-weekly of perhaps 10,000; making an aggregate of 85,000 subscribers, or an aggregate weekly circulation of 220,000. Now if the Gazette were the only political newspaper in the State, these figures would not be surprising; but when we remember that there are 229 more newspapers in the State, advocating the same or similar topics, one must be stolid and stupid if he cannot indicate the general tendency of the reading community. If one lawyer in fifty kept himself fully posted on the enactment of new laws, the repeal or amendment of old ones, and the decisions of the supreme court, and the other forty nine depended upon their attendance at court to learn what was new in the legal world, how much confidence should the public repose in these forty-nine as to their competency and ability to practice successfully? Suppose one physician only in fifty kept himself fully advised of the progress and discoveries in medical science, what would be the status of the profession to-day? Simply this: they would bleed in fevers, prescribe calomel and jalap, and forbid the patient to drink cold water so long as the fever continued, which system in this, our day, would kill ten where it would cure one. What if one merchant only in fifty subscribed for a bank note detector or price current, is there any certainty that one-half the money he received would not be either counterfeit or worthless, and his buying and selling prices be governed by the merest whims?

No, in this day of steamships, railroads, and telegraph, reading is indispensable in the successful prosecution of any branch of productive industry, commerce, or profession. But, as I said before, these annual agricultural fairs have accomplished that which books and newspapers could not accomplish in the same space of time, namely, they have awakened a deep interest in agricultural matters, and the reason is simply this: farmers believe that writers or bookmen know nothing of agricultural affairs, and this belief is a very serious impediment in the improvement of agriculture. They forget that there are several classes of persons in the world: one class, the theoretical men like Liebig, Emil Wolff, and Stoeckhardt, who understand all about agriculture, but perhaps could not plow a single furrow properly, to save their lives; the others are practical men, who can perform all agricultural operations, but cannot possibly explain why one grain of wheat will sprout and grow while the grain lying by its side will not grow. Or in other words, the one class is like a man who manufactures locomotives, but cannot run one on a railroad, and the other class is like the engineer, who will run a locomotive sixty miles an hour, but cannot possibly build one. Now when the farmer declares that the bookman can know nothing of agriculture, it is just as if the engineer said that the manufacturer knew nothing of a locomotive, notwithstanding the latter built it.

There is a vast deal more known of agriculture as a science than there is practiced of it as an art or handicraft. To improve and develop our agricultural resources, we must bring these two classes of men together; the scientific man must take the practical man by the hand, as a fellow laborer in the same cause, and the practical man must learn to respect the opinions of the scientific man, the same as he respects the opinions of his lawyer, doctor, or preacher. There is no antagonism between scientific and practical agriculture—the one is simply a demonstrator of the other; science suggests while practice performs, or practice discovers while science explains and records it. But there is a jealousy and a mistrust, which has been engendered by a misunderstanding or absolute ignorance of the relative position which each one occupies. How are these two classes to be harmoniously brought together? The annual fairs present an opportunity, but in a very partial manner. The practical farmer here sees at a glance what some of the natural sciences can furnish, in the shape or form of scientific principles wrought out and made manifest in the various kinds of implements and machinery. These machines and implements he can see and feel, and they manifest themselves and address his judgment as the embodiment of principles—of means adapted to secure a certain object. The abstract principles involved he may not recognize; and because they do not address themselves to his senses as palpably as the machines do he doubts, perhaps, the existence of such principles, and almost always doubts their efficiency, their reliability, and often sneeringly terms them "book farming," or "theoretical farming," and flatters himself that he has given the matter a quietus by an *ad captandum* argument, when in reality he has only confessed his own utter ignorance.

The practical farmer sees here on exhibition improved breeds of domestic animals; they fill his admiring eye, and he points with great pride to their well developed and symmetric forms as a great triumph of the art of agriculture. It does not occur to him that this perfection of form and symmetric beauty have been attained by rigid and persistent application of scientific principles. He perhaps purchased a pair of these improved animals; and, taking no more or no greater care of them and their progeny than of very ordinary animals, in the course of several generations is surprised to find that they have deteriorated in many respects, and he then perhaps becomes disgusted, and pronounces them a cheat and a humbug. The truth is, simply, that he has omitted the application of those scientific or physiological laws and principles which originally secured the improvement. In order to demonstrate that the position assumed is correct, it is only necessary to refer to the fact that the domestic animals which, twenty-five years ago, triumphantly bore away the first premium would, at present, scarcely receive any consideration at the hands of our intelligent awarding committees. Just as much as the domestic animals of Ohio are superior at present, as compared with those of twenty-five years ago, just precisely so much progress has been made in the recognition and practical application of physiological or scientific laws and principles, whether acknowledged by these names or terms, or not. And this recognition and practical application are due to the labors of county and state agricultural societies rather than to any other cause whatever.

However many other things these societies may have done which they should not have done, and however many things they have not done which they should have done, they have nevertheless accomplished one very important object: they have awakened an interest in agricultural and mechanical pursuits, and developed many sources of productive industry. They have enlisted the sympathy of thinking minds, and secured the attention of benefactors of the human race; and, more than all, have made labor and industry respectable and honorable. If you require proof of this statement, I refer you to one phase in our social life which fully demonstrates it, viz: twenty-five years ago there was very little more than half the population there is at present in the State, and yet, at every term of common pleas court, ten times the idlers and spectators were in attendance that there are at present; people have learned that it does not "pay" to drop the ordinary farm labors and workshop to attend the court. In fact those only go there now who have business there, and instead of making the court room their pleasurable resort, they now go under compulsion. Twenty-five years ago it was considered a post of honor to be on the "jury;" at present our best citizens avoid the position as if it were fraught with pestilence, and that class of people who "hang around the courthouse," and are professional jurymen, have lost the cast of their former social status.

Now that an interest in agricultural affairs has been awakened, it becomes us seriously to consider how this interest may be directed so as to produce the most beneficial and practical results. These agricultural societies may very properly be regarded as agricultural primary schools, the directors or managers occupying the position of teacher, and the public constituting the school or scholars. If the teacher is competent and efficient, then the school will flourish; if, on the contrary, he is incompetent and indifferent, everything will be tardy and irregular. The directors should be gentlemen, not only in their manners and address, but persons in whose ability and integrity the public should have entire confidence, because there is a heavy moral resposibility resting upon them. If for the sake of a few dollars they will prostitute the purposes of the society, and convert the annual exhibition of industrial products into a circus, or place of profitless amusement, they may vitiate the taste of the entire community by a persistent course of this kind of conduct, may retard the progress which otherwise would certainly have been made, and bring agriculture and its progress into local disrepute. The judgment of the board of directors should have as much weight in agricultural matters, in the county in which they reside, as the decision of the judge on the bench has in the county in which he delivers his opinion on a case tried before him. In order that the directors may attain to this prospective desirable influence, many reforms now practical are not only desirable but essentially necessary. The history which the county agricultural societies in Ohio present is very similar to the history of a child: first a period of absolute helpless infancy, then a period of teething, then measles, then croup, then chicken-pox, then whooping cough, etc. In many instances the societies succumbed to the maladies, and passed out of existence; others, more robust, struggled stoutly—lived through the difficulties, and are now on the high way of success, rejoicing. The directors, however, must inaugurate a new system as the societies are approaching maturity, and must deal more earnestly with the mission they have undertaken, and do something more than simply conduct an exhibition.

Almost every society in the State owns, in fee simple, the grounds on which these exhibitions are held. So far as agriculture is concerned, these grounds lie idle from one year's end to the other, except the week of the fair. The society should erect on the grounds a comfortable dwelling house, which should be a model for convenience and comfort, and within the means of persons of moderate means to imitate; then they should secure a competent and in every sense trustworthy tenant to reside in it. Whenever any agricultural tool, implement, or machine is brought before the board for recommendation, it should be presented by the introducer as a gift or donation to the society, and the officers of the board should place it in the hands of the tenant for thorough trial, and to report upon, either written or orally, to the board after a thorough test has been made. The decision of the board will then be of intrinsic value, not only to the manufacturer but to the agricultural community; because if the tool or implement does not, upon trial, prove to be as was represented, then, of course, the board will not recommend it for general introduction. On the other hand, should it prove meritorious, the board will not hesitate to give it their highest and most earnest sanction and commendation.

The tenant should have, at his command, some six or eight acres of land to be used as an experimental tract. On this tract experiments should be carefully conducted in every respect, so far as plant culture is concerned, He should make experiments in underdraining—should underdrain at various depths and at various distances apart; should make experiments with different plows, and should plow at various depths—from four inches to a foot; should make experiments in thick and thin sowing—shallow and deep sowing, broadcast and drill sowing; for there are many things connected with all these conditions which we do not yet understand. He should be allowed several acres for experiments in gardening and small fruits, and a nursery; in fact, there is no good reason why the entire nursery business of the county might not be transferred into the hands of the county agricultural society. In the garden he should make experiments on the culture and varieties of strawberries, currants, grapes, raspberries, blackberries, etc., as well as upon all manner of vegetables. Under proper direction, and with judicious management, the gardening and nursery portions may be made the source of a handsome revenue to the society; for, if they pay in private hands, what good reason is there for supposing that they would not be equally remunerative in the hands of the society? Then the grounds should be properly and tastefully laid out—there should be a flower garden, and a green-house, well filled with choice plants and cuttings; boquets and floral ornaments for picnics, parties, balls, weddings, and even funerals, would yield a remunerative revenue, and the fair grounds would become the most delightful, interesting, and desirable resort in the county. So far as the nursery part is concerned, the public would feel that everything supplied from it would be true to the name. I assert, without any fear of successful contradiction, that there is more money expended annually on worthless trees and plants brought in, and hawked about by tree peddlers, than would pay all the expenses of the proposed nursery portion; it should, by all means, be at once instituted as a matter of safety and economy. Good and fine apples will always command a dollar more per bushel than poor ones in the city markets, and it costs no more to grow a good apple, pear, or peach than it does to grow a poor one.

At the time of the fair every visitor will be a deeply interested student, and the anaconda, fat woman, giant, and monkey show will attract no attention, even if admitted on the grounds. Every visitor will be noting the improvement, order, and arrangement; the example will be contagious, and in a few years many rural homes will present such attractions and beautiful appearances that those who are too indifferent or too indolent to follow suit will justly be stigmatized as wanting in good taste. It may be urged that all this will cost money, time, and labor. If they did not cost these, you undoubtedly would already have them. Did your jail cost nothing? It is a county institution as well as the agricultural society. Is it not better to prevent crime than to punish those who commit crimes, and by giving encouragement to industry and refined taste, do we not certainly make a grand step toward preventing crime? Did those who were taxed to build the jail expect to be confined in it? No, indeed! It was built for common protection, and the agricultural society should be sustained for the common benefit. Your county infirmary cost money, time, and labor; did those who were taxed to pay for it expect to become inmates? Is it any more a public or county institution than your board of agriculture? Ornament your fair grounds; have your tenant make practical and desirable experiments; sell or distribute and exchange seeds, cuttings, etc., and you will have less use for jails and infirmaries than you now have. And, by adopting this plan, your county grounds become the primary school of agriculture and horticulture. I have no doubt that many parents would willingly place a son under the care and tutorship of the tenant, to learn from him many of the methods, systems, and processes practiced by him on the grounds. Every improvement in the culture of farm crops will radiate over the county from the fair grounds as from a common center. In the spring time a hundred young men, for a small fee, might spend a week there under the instruction of the tenant, to learn grafting, budding, innoculating, underdraining, planting trees, trimming grapes, etc. There should be a tilery on the grounds, and tile furnished at prime cost to farmers for underdraining. I do not dispute the fact that the horse is a noble animal—not only noble but intelligent, and one of invaluable service to mankind: his usefulness is freely and fully admitted by every agriculturist. But our agriculture is not all horse; there are many other interesting productions relating to and closely connected with agriculture, which equally merit our attention and consideration. There is no necessity for giving the horse a ring spread over ten or twelve acres, and limiting all the agricultural and industrial products to five acres. For myself I love to see a horse "go" as well as any other person does—like Henry Ward Beecher, I think "he was made to go"—but I see no propriety in converting these industrial exhibitions into a horse race, and making the ring the central point of attraction of the entire exhibition. A few weeks ago there were famous races at Cincinnati. Now, as trials of speed, these races were well enough, but no farmer would give $50 for Lancaster or Exeter, to be by him harnessed up and hitched to a plow to break a sod field; in a word, the farmer, in the true sense of the term, has no use for a "race horse," and a test of speed is not a trial of strength, or of any of those qualities which a practical farmer deems indispensible in a good farm horse. Then, too, there is that miserably vicious system of betting always accompanying a race. A. bets $50 that Lancaster will win; B. bets $50 that Exeter will win. Now, what is the moral of this? Is it simply that A. is willing to pay $50 to be convinced that he is mistaken in his judgment, or rather that he is villain enough to tade B.'s $50 without giving him anything in return for it? This habit of receiving money without rendering an equivalent is the basis of the greater portion of the crimes now committed.

If agricultural societies generally throughout the State, or even if a majority of them, will adopt a plan somewhat similar to the one indicated, of making the fair grounds an experimental tract, the State will, in a few years, find itself compelled to locate and establish the agricultural college. It is a very difficult matter to convince the Legislature of the necessity of a college before we have common schools. If the agricultural societies will imitate the system which I have briefly outlined, these societies will not only secure a self-sustained revenue from the products of the experimental tract, but will gain for themselves the honor and reputation of being real and absolute promoters of agricultural progress and its allied industrial pursuits—a reputation and position much more honorable and desirable than can possibly be conferred by the discharge of the duties enjoined by any political organization or association.

As a rule we do not like farming well enough to settle down in young manhood and make it a vocation for life. We farm because we must—necessity demands it at our hands—it thus becomes an irksome and laborious duty, and every one flees from it to some more apparently elegant occupation. Even farmers themselves encourage their sons and daughters to think that there are more honorable, pleasant, and easier ways of gaining a livelihood than that of farming. This same class of farmers, however, set no example of learning themselves, or teaching their sons the ways and wherefores of agricultural operations; and surely it is by no means surprising to find young men disgusted with an avocation which promises nothing else than unremitting care and a dull routine of continued and severe labor; while in truth agriculture, intelligently interpreted, is one of the most interesting and soul-inspiring occupations under the canopy of heaven. The parents are opposed to book farming, and if the son manifests a taste for reading and acquiring information, the parents, in nine cases out of ten, direct his energies to the acquirement of a profession, rather than to learn to apply science to agriculture.

Hence it is that our most successful agriculturists are as a rule gentlemen who have been engaged in active town or city life, where much thought, energy, activity, and enterprise are required; they have been taught system, order, prudence, and economy in the adaptation of means to ends—to do everything well, and to do it at the proper time. Hence, too, it is that so many of the young men who have left the quiet farm in the country for the noise, din, and bustle of city life, so often become first the victims of the vicious and demoralized in the city, and then follow in the footsteps of those who have deceived, betrayed and ruined them. I have made careful inquiry, and make the statement upon reliable authority, that, of the vicious and criminal young men under twenty-five years of age, convicted of crimes committed in the city, a greater proportion of those born and reared on the farm until fifteen to eighteen years of age were convicted than those born and reared in the city. Parents must have a very slight appreciation of the dangers and hazards to which they are exposing their children when they permit them during their minority to exchange the quiet rural home for the busy and ever active one of the city. If farmers' homes can be adorned and beautified—if they can be made desirable to such a degree that the farmers' children shall feel that

"There's no place like home,"

a very great step in advance will have been secured. When the farmers' sons learn that there is just as much science and skill required in curing a disease in the horse as there is in the human subject, he perhaps will not object to studying veterinary surgery and medicine; but, so long as we regard the noble horse as an absolute brute, and the horse doctor as a cross between a quack and a loafer, no intelligent young man will for a moment think of embarking in such a career. At Berlin, in Germany, and at Alfort, in France, I found the sons of the nobility, the wealthy, and the sons of the learned and highly honored, as students of the veterinary science; there the veterinarian or "horse doctor" is sure, if competent, of a position in the army, and from the army of promotion to the higher ranks of official life. This prospective promotion may be the inducement in those countries for the pursuit of this course, but in this country there is nothing in the form of professional life which offers so wide a field of practice or such certain remunerative reward as the practice of veterinary surgery and medicine.

Many farmers themselves seem to be averse to these educational movements, but the tide is rolling onward and will not be stayed; and the sooner each one resolves to mingle with the onward current the sooner will our agriculture be more remunerative, better ordered, and become a permanent and fixed avocation, and no longer be the haphazard, amateur handicraft that it now is.

I cannot better close this address than by reading an extract from a letter from Geo. Summer to Prof. Agassiz, on the project of a "conservatory of science and art:"

"A museum like this would, I believe, aid most powerfully in creating a greater interest in the mother art—would tend to retain on their paternal acres those crowds of young men who now flock to our great cities, there to drag out a trivial existence, useless to others, or even to themselves—would aid, also, in taking away the false mantle of 'respectability' in which the unproductive drones of society wrap themselves—would aid in destroying that last remnant of feudal barbarism, the *contempt for labor*—and would tend to give intelligent labor its true position of highest honor. If I seem to speak strongly, I may here appeal to the experience of other countries, and especially to that one in the government of which the aristocratic element finds a larger place than in any other.

"Some eight or nine years ago, when visiting a landed proprietor in England, he remarked to me that all his estate, except the park and the garden, was let out to farmers. Of his three sons, two were then pursuing their university studies, one to become a hereditary legislator, one to become a clergyman, perhaps a bishop. The youngest son was destined for the army. Not long since I again visited this same estate, and was somewhat surprised to find the future bishop and the future general hard at work as good farmers. Alluding to this change in their career, the father said: 'Farming is quite a different affair now from what it was a few years ago. Lawes and Liebig have changed all that. When it was found that there was as much room for science and intelligence in cultivating the soil as in making sermons or moving soldiers, farming became quite a fashionable occupation; and for me, I am glad of it.' His two manly sons heartily responded to this. Similar examples I often saw on other estates.

"If the sons of English noblemen, stimulated by an interest in the development of agricultural chemistry, find as much honor in tilling the soil as holding commissions in the army, perhaps, under similar influence, some of the young men of Massachusetts may consider it quite as 'respectable' to hold the plow as to handle the yardstick, and find it quite as worthy an exercise of their active intelligence in making a chemical analysis of the soil they cultivate, as in ciphering out in a counting house the most perplexing trial balance."

SOUTHEAST MISSOURI.

Its great and varied mineral and agricultural resources—The early settlement—A valuable historic and descriptive sketch.

The first civilized settlements embraced within the limits of what is now the State of Missouri were made by the French, and those settlements almost exclusively in the southeastern part. The principal portion of the early settlers consisted of hunters, traders, and miners; the rich lead and other mines of this district being then the only known mines west of the Mississippi, those of upper Illinois, Wisconsin, Southwest Missouri, and Western Arkansas being then Indian territory. These colonists seem to have had no fixed organic laws prior to the charter of Louis XIV, dated September 14, 1712. The officers of the government modified the edicts, ordinances, and custom of Paris so as to adapt them to the condition of a new country and its provincial form of government. These officers having extensive powers, their proceedings in the adjustment of private controversies were prompt and summary, leaving little inclination for litigation among the early settlers. The few land grants of that period had their origin in the modified colonial laws of France.

CESSION TO SPAIN.

In September, 1762, France ceded to Spain all the country west of the Mississippi, and to England all the country east of that river. This event caused the removal of French citizens from the east to the west side of the river, and the settlement by them of Ste. Genevieve, New Bourbon, and St. Louis. Although the early settlers were chiefly French, the grants of land afterward made, up to its cession by France to the United States, seem to have been exclusively made under the laws of Spain, and all proceedings of the provincial authorities were in the Spanish language, land grants and surveys being in the same language.

In October, 1800, the country west of the Mississippi was retroceded by Spain to the French Republic, and in April, 1803, it was sold by that power to the United States, under the presidency of Thomas Jefferson. In December, 1804, formal possession was taken of upper Louisiana, now all the States north of the Arkansas, by Amos Stodart, on the part of the United States, and in 1805 the President was authorized to appoint a governor, secretary, and three judges, who, in addition to their other powers, were jointly authorized to make such laws as they might deem necessary for the welfare of the territory, and were further empowered to establish inferior courts.

ORIGINAL COUNTIES OR DISTRICTS.

Originally there were five counties or districts, viz: St. Louis, St. Charles, Ste. Genevieve, Cape Girardeau, and New Madrid.

IMMIGRATION.

At this period immigration to Southeast Missouri fairly commenced. Her rich lead deposits became known in the States, and her mines opened by a hardy, fearless, and in a great degree reckless class of emigrants from the States and from Europe. Unfortunately for the prosperity of this part of our State, the work of lead digging was rather mining *at* than *into* the rich deposits. The pick and shovel were the only instruments used; pockets and surface diggings were sought for everywhere, and true veins, when found were turned aside from and rejected, so up to this day very little scientific mining has been done; and although many thousands of tons of lead have been extracted in this rude way, it may be safely said that not one per cent. of her known mines has been extracted, while the geological indications are that much ot her best and richest lead deposits remain undiscovered; and as to her rich and varied iron and copper mines, so little has been taken that when compared to the immense quantity remaining it is hardly worth naming. The extent of country covered by these mines is one hundred and twenty miles north and south by an average of sixty east and west, and richer in the useful metals than any portion of similar extent on this globe; while it is believed that gold-bearing quartz will be found in quantities yielding a more profitable return than do the mines of this metal in our western and northern territories.

THE METALS.

We in a former article described the iron, lead and copper mines west of Meramec and along the line of the Atlantic and Pacific railroad. It is our purpose in this to describe the country east and south of that river; to point out briefly, yet we trust clearly and definitely, the vast and varied mineral wealth of this portion of our State; its mild climate, and capacity to sustain a large mining, agricultural and manufacturing people, and most especially to point out its capacity to manufacture all articles of steel, iron, copper, and zinc. The most northern lead fields are in township 41, range 5, east, extending southwardly one hundred and twenty miles. Such are their extent that mines of that metal can be found in almost every township, or if not yet found and opened, geological indications clearly point out their existence in large paying quantities.

Copper ore of superior quality is found in Shannon, Madison, Wayne, Iron, Washington, and Jefferson counties, tin and platina in Madison, zinc in Washington, and cobalt and nickel at mine La Motte. Gold-bearing quartz has been found in Madison, and it is believed it will be found in largely remunerative quantities in Shannon county. Tin is also known to exist there, and also in the northern part of Butler county.

The largest, and, indeed, most profitable, ore is iron. Here is found iron ore of the purest and best kind, inexhaustible in quantity, so that there is enough to supply the demands of the whole world to the end of time, and covering such a vast extent of country that it is impossible to monopolize it. Such also is its variety that it can be used, from the most simple casting up to the finest article of cutlery, or even to the spring of a watch.

The *purblind* policy of our large owners of vacant lots within St. Louis has greatly retarded if not entirely prevented this branch of useful and necessary industry being long since successfully and profitably carried on here, so that we might have held as high a position in the manufacture of all articles of steel and ironware as we now do in machinery and general castings. If these lot-holders will persist in their mistaken course, then the only remedy left to industry and enterprise is to find some point or place on the Iron Mountain railroad, south of the Meramec, where the pure coal of the Chester and Big Muddy coal fields can be cheaply delivered, and there establish rolling mills for all kinds of iron, and also for the manufacture of all kinds of steel, and the various articles manufactured from steel. Copper and zinc would give constant employment to a rolling mill of the largest capacity; the quantity of these metals used and sold in St. Louis is fully six millions of dollars' worth annually, and that of wrought iron and steel not less than twice that sum. Here, then, we have within our reach a rich source of wealth awaiting the prompt efforts of enterprise, capital, and skilled workmen. The greatest hindrance to cheap and successful mining comes from the numerous chartered mining companies and large owners of mineral lands who do not nor will not mine themselves, and refuse to permit their mines being worked at any fair or reasonable rent. We trust this selfish policy will soon meet with a prompt, decided, and effectual check. We know that measures are in progress to procure a charter, by a number of experienced practical miners, to open, explore, and work in this State, mines of lead, iron, tin, copper, and zinc, they paying as rent ten per cent. of the yield of the several mines. And we know that there are many liberal land owners who will give mining leases at that rate. The same encouragement should be given to all workers in iron, copper, zinc, and flint glass. For the manufacture of the latter article there can be found at Ste. Genevieve, and also, in St. Louis and Franklin counties, silex of the purest kind. The former place has for many years sent this valuable white sand to England, Boston, and Pittsburg, to be manufactured there and returned here for consumption. The same may be said of our iron and copper. Such a mistaken course should not be permitted to continue.

MARBLE AND GRANITE.

In addition to the great and varied deposits of all the useful metals in Southeast Missouri, there are also most excellent quarries of marble and granite. The most demanding our notice is within the city limits; a pure black marble, unsurpassed by any Italian, and fitted for chimney and mantel-pieces, is found just above low-water mark, on the shore of the river, half way between the arsenal and Carondelet. This rich source of wealth seems to have been unknown to the State Geologist, and unnoticed by our stone-working mechanics, and yet this fine marble can be placed in any yard or house in this city at less than one-fifth cost of the foreign article, in no way superior to it.

There are also large quarries of variegated marble in Iron county. Barytes, an article much used as a substitute for white lead, is found in large quantities and of great purity in Jefferson county.

KAOLIN.

In the southeast corner of township thirty-five, range one, east, there is a large deposit of kaolin, and there was for some years a pottery there. Here can be manufactured superior stoneware to meet the wants of the valley of the Mississippi.

We have tried to bring into due and deserved notice the varied and numerous minerals of this part of Missouri. To name and particularize each mine would largely extend this article.

FRUITS.

The counties through which the Iron Mountain railroad passes has and will, by giving a rapid and cheap access to market, cause the planting of a large number of orchards and vineyards, the opening of many farms and market gardens, and an increased supply of cattle and sheep, so that a full supply of these most useful articles are being prepared to supply the wants of a mining population and the St. Louis market.

THE IRON MOUNTAIN RAILROAD.

The railroad from its present terminus at Ironton is under contract, and in a rapid course of construction in a southeastern course to Belmont, nearly opposite Columbus, Kentucky; there it will connect with roads running south and east, and in time we feel confident there will be a direct line of road, giving to Missouri the nearest access to the Atlantic, and opening to the whole West the great advantages of the port of Norfolk, Va., and a direct trade thence to and from Europe. By examining a map prepared by the General Land Office, we find that Helena, Ark., is nearly due south of Ironton. In due time, and with our rapidly increasing immigration, we feel confident that a railroad must and will be built from Ironton to Helena, thus giving to Missouri a market and outlet for her manufactures at a point below the contingencies of low water or ice, and besides opening up to trade and cultivation a long neglected portion of Southeast Missouri and Northeastern Arkansas—both of them most inviting to colonies of active, intelligent, industrious immigrants, who by their industry and skill will not only improve and beautify their own lands, but impart to their stolid neighbors a portion of their indomitable energy, and cause a spirit of improvement to spread around them—men who will take good care to carry with them, or have established there, those great civilizers, public schools and churches.

Helena, then, and not Memphis, is the proper place to make a southern outlet for manufactures of iron, copper, and woolen and cotton goods, all of which must, and will be ere long manufactured in Missouri; and we trust the day is not distant when we can supply all the South with articles of cutlery, hardware, iron, and steel, as we can at present supply them with castings and machinery of the best quality

DUTY OF THE STATE.

The State has a great duty to perform to give proper encouragement to her iron manufacturing interest, and that is to insist, in all future charters, or aid and assistance given to railroads, that they shall be required to use Missouri rails, chains, engines, and cars. This would do much to aid and encourage rolling mills, on their first being put into operation. In a few years the iron necessary to relay our present roads, a southern demand, and several short lateral roads will give full and ample employment to this class of industry. To insure full success we must attain that prominence and perfection in the manufacture of iron and steel which we have attained in castings and machinery.

DESCRIPTION OF THE MINES.

We referred in general terms to the large masses of iron ore, almost pure metal, found in the district under consideration. All of them are well known here; yet, for the benefit of distant readers, some of whom may desire such information with a view to investment, we name and describe a few of the largest. The Iron Mountain, Pilot Knob, Sheppard and Bogy's mountains are among the greatest natural curiosities in the world. They are 1500 feet above tide water, 1000 feet above the Mississippi river, and east of the geographical center of this continent. These mountains or masses of iron are the astonishment and admiration of geologists and iron men, and are the richest class of specular ores.

There is besides a number of other iron hills of less magnitude, yet quite large enough for any one of them to supply the whole valley of the Mississippi with iron. These mountains, hills, and mines would yield 1,000.000 tons of wrought iron annually for 1000 years. The depth of the lead-bearing rocks and extent of surface are greater in this State than in any other portion of the globe. The same may be said of copper and iron ores. On the north and west of this great iron center are found lead, copper, and zinc; on the south and east, copper, silver, argentiferous lead, nickel, cobalt, platina, and gold.

Near to these mines are the villages of Iron Mountain, Pilot Knob, Middlebrook, Ironton, and Arcadia, all of them thriving towns. Coal to supply the demands of large foundries can be sent by the railroad from the mines and points already indicated.

SCHOOL OF MINES.

Were there proper State pride, and a laudable desire for the great future of Missouri, here, in Arcadia valley, should be located the agriculture college, with a branch or school of mines attached thereto, such a school in this State being quite as important as agriculture. That, however, is hardly to be looked for or expected. It is the manifest destiny of the agricultural lands to follow the swamp and all former grants or donations of land by the general government to this State, and be wasted or misapplied so as to yield no permanent benefit to the whole people of the State. Our hope is from another source. A bureau of mines will be shortly established at Washington, and a school of mines will soon follow. Here, then, is the point or place where that school should be located. In no other place in the whole Union can such an extent or mass of the useful metals, rocks, and ores, known in geology and laws connected with mineral veins, be found, and within a convenient distance of the students. The place is, besides, remarkably healthy. For our navy, ironclads are in future to prevail. Missouri iron is confessedly the very best for that purpose. To supply our navy, a largely increased number of engineers will be required. This is an additional reason for placing the school of mines at this point. In our opinion the students sent to this school to prepare for practical and mining engineers should be taken exclusively from the most efficient scholars in the public schools of the several States.

The valleys of Bellevue and Arcadia are rich and beautiful, capable of sustaining a large population, which are sure to cluster around the mines and settle in the villages already named. In the valley of Current, Big Black, St. Francis, and Castor rivers will be found many excellent farming sites, while the uplands are well adapted to sheep, cattle, horses, and the cultivation of all kinds of fruit, especially grapes, peaches, and quinces. These remarks will apply to the whole country along the line of railroad from the Meramec to the Mississippi —a distance of over two hundred miles. As we have already shown, in the swamp district, cotton, corn, and cattle can be raised in great abundance, and at little cost; so that it may be safely and confidently said that in ten years from this time, with the use of capital, energy, and encouragement to manufacturing operations of all kinds, there will be found in Southeast Missouri fully five million of intelligent, industrious, prosperous and happy people, all having profitable and constant employment, whatever branch of business they may engage in. As a further inducement to rapid and early emigration, we desire to assure all that millions of acres of good lands can be purchased at from one to five dollars per acre, and farms at from five to twenty dollars.

With the numerous advantages which we have endeavored to point out, we feel warranted in assuming that no part of this Union offers greater or more substantial inducements to the active, enterprising, industrious emigrant than does Southeast Missouri.

We might further amplify and give many additional facts to convince the most skeptical. To the determined unbeliever we say, come and see—that will bring conviction.

ITEMS OF STATISTICS AND THOUGHT.

BY REV. MARTIN W. WILLIS.

The following articles of careful statistics and suggestive thought will interest the agriculturist of Missouri. The statistics furnish valuable facts for future reference, and the other articles contain excellent hints.

FREE MISSOURI IS MARCHING ON.

In August, 1821, Missouri became the twenty-fourth State in the Union. The famous discussion between the North and South as to extension of slavery resulted in the Missouri compromise, which yielded this great State to the slave power. For forty years that power had free scope to do its best, and prove its right to control the destinies of Missouri. Never was there a fairer opportunity offered to test the temper and qualities of southern civilization against northern enterprise than Missouri presented. With a splendid geographical position, with almost unlimited capabilities in climate, production, and natural wealth to attract population, capital and enterprise from all the world, how little was accomplished in Missouri, compared with Illinois!

In 1820 Missouri had a larger population than Illinois by ten thousand inhabitants; but now Illinois has two million two hundred thousand people, while we have perhaps one half that number.

The same fact appears in a comparison of valuations. In 1850 Missouri had $137,247,707 real valuation, while Illinois had $156,265,000. But in 1860 Illinois had increased her valuation 475 per cent. according to the 35th table of the census, while Missouri has gained 265 per cent. In 1860 Illinois had 13,251,473 acres of improved lands, and Missouri had 6,246,871. In 1860 the cash value of farms in Illinois amounted to $432,531,072. But in Missouri it amounted to $230,632,126. The value of farming implements in Missouri, by census of 1860, was about ten millions of dollars less than in Illinois. These unwelcome facts of the census disclose what Missouri has accomplished by slavery, and what Illinois has achieved with freedom.

Illinois had no advantage for which Missouri has not some compensation. Here is the plain record of forty years. The slave power enervated and demoralized our people, while it repulsed thrift and enterprise, and taught emigration to avoid Missouri; for industry was without honor, and the idea of progress was scouted as fanaticism.

In a period of forty years how little development did our immense mineral and agricultural resources receive! There were large land owners, but only a small portion cultivated, and that was done in part by the forced labor of the slave, who did as little as he could, and was as long as possible doing it. Meanwhile, Michigan, Illinois, Wisconsin, and Iowa, far less rich by nature, but moved by the impulse of freedom and progress, invited immigration to their soil, and advanced with mighty strides in the development of their resources, and in the increase of their population. Missouri advanced with tardy step, while Ohio and Illinois were building up a splendid civilization on the basis of freedom, establishing schools, colleges, and churches, by the surplus wealth which their enterprise produced. Two years since, on 11th January, 1865, Missouri proclamed impartial freedom, which Bancroft in his oration pronounces as one of the causes that overthrew the rebellion. From that hour Missouri began to recuperate. Property began to rise, and immigration to pour in. The Eastern people listened with no stinted interest to what they heard of the State. Our own people shook off the torpor and lethargy of the past, and everywhere began to think of bettering their fortunes. Labor saving agricultural inventions found rapid sale. Since Missouri pronounced for freedom, not less than a hundred and fifty thousand emigrants have come. New England that sends 50,000 of her sons West every year, will no longer seek the cold regions of Wisconsin, Michigan, or Minnesota, but our better soils and more genial skies. Already Pennsylvania, Ohio, Indiana, and Illinois, represented by an advance guard of good men and true, will send forward the main body of half a million. Our straggling settlements have grown up into large and flourishing towns. Schools, colleges, and churches are being organized. Mills are built, manufacturing started, railroads extended, and mines of various minerals opened and worked. The pressure of emigration is now to Missouri. Ten years ago it swept our borders, and built Iowa, Kansas, and Nebraska. Had Missouri been a free State in 1820, we should have to-day a population of three millons of people on our 67,000 square miles. But free Missouri is marching on to her noble destiny, so long withheld.

Out of darkness and storm, out of the gloom and shadows of the past, free Missouri emerges, radiant with the smile of hope, into the grand arena, and generous rivalry and free States of the North. On her banners are inscribed "Justice to each, and freedom for all." She has come out of Egypt and the wilderness, singing the songs of liberty. Missouri knows no backward step.

CITY AND COUNTRY.

The tendency of population to our large cities, is ominus of evil to the country.

A vast foreign emigration lands in our cities, and clings to them, in poverty, in pauperism, or in crime. This is all wrong. Too many of our young men, bred upon farms, go to our cities in search of what they deem an easier or more respectable mode of living. Great manufacturing interests are centering in our cities. However extensive our manufactures, or wide-spread and remunerative our commerce, we must look to agriculture—the cultivation of our lands, and their annual, rich products—as the basis of our national welfare, and the guaranty of our national prosperity. Every acre put under cultivation, adds so much to the wealth of the whole people. Since these things are so, it is an alarming sign of the times that our city populations increase so rapidly, with increasing poverty and suffering.

If one-half of our city population should return to the pursuits of agriculture no legitimate business would suffer. We should have more producers and less exchangers of products. More would live by work and less by their wits. The business of the country could be carried on at far less cost, while the real riches of the country would be greatly increased. There would be less fraud and failure—less loss in money, mind, and morals. Let those having influence use it to teach the young men of America the nobility, the honor, and duty of cultivating the soil, and achieving that noble independence which belongs to the country, and not the city. Let them look to the West —to the fair fields of Missouri. Let them come and enrich themselves and the State, making our lands fruitful with golden harvests.

INTERESTING TO WOOL GROWERS.

Missouri yields the palm to no State in respect to sheep raising. Its advantages are so great, in comparison with more northern States, that they attract the attention of the wool-growing interest all over the North. The mildness of the climate, the early, sunny spring, the little winter feed necessary, give Missouri an advantage that Minnesota, Iowa, Wisconsin, and Michigan do not possess. With equal flocks, and equal management and care, sheep raising is fifty per cent. more profitable in Missouri than in more northern latitudes. There is no other business that pays better. The diseases incident to sheep in more severe climates, with long winters, fierce storms, and deep snows, are not known in Missouri. Wool growing cannot be over done. There is no business or production so secure in result, so certain to pay generous profits, as this.

FRUIT GROWING.

North Missouri lies in that belt of country, extending from Maryland to Kansas, which we denominate the fruit-growing region of the United States.

North of this line fruits are often stricken by frost, and south of it are an uncertain crop at best. Apples, peaches, pears, cherries, and plums come to bearing much earlier here than in more northern or eastern States. The soil, the seasons, and the climate of Missouri are specially adapted to fruit growing.

Grapes.—This State will certainly become a great grape-growing region.

Our wines have recently been spoken of in England with admiration.

Single acres of our vineyards have, of late years, netted the owners from five hundred to a thousand dollars each.

The Germans will make Missouri as famous for wines as their own fatherland.

WHAT OUR PRAIRIE LANDS CAN DO.

Prairie, broken in time and sown in the fall with wheat, is deemed sure for a crop which will pay for plowing, fencing, and the cost of the land, the first year. This can be attested to by practical farmers who have done it- Look at it!

Suppose you pay for forty acres $320, and call the fencing $320, and the cost of labor $200, and $60 more for extras—the land, the fencing, the sowing, the plowing, the labor, costs then $900, and these estimates are large. Now suppose you get twenty bushels of wheat to the acre, a product of 800 bushels; suppose you realize only $1 50 per bushel, and while writing this article wheat is selling for $2 50 per bushel, a poorer article for $2 00; at $1 50 per bushel your 800 bushels produce you $1,200—$300 more than the cost of land, fencing, and labor. But if you received only $1 00 per bushel, and realized what has often been done here, twenty-five bushels to the acre, your crop, including cost of land, fence, and labor, would pay for the whole, and leave you $100 in hand; and, what is more to the point, that land will not only pay for itself by its crop the first year, but will increase in cash value annually, for years to come.

We present this calculation not to amateur, philosophical, theoretical men, who never used a plow or reaper, but to the practical, skillful farmers of the country.

GO IN AND WIN.

Some people are always hanging back if anything is to be accomplished, or any new enterprise is to be inaugurated. They are afraid to venture anything. They think enterprise is only speculation, and business talent a sort of gambling propensity. You can hope for nothing from these slow-coach, easy-going, fearful men. They call procrastination prudence, and doubting discretion. One man of enterprise, pluck, and grit is worth a regiment of do-nothings.

The successful are those who dare to go in and win—who take chances to better their fortunes. No man succeeds who looks on the dark side until all sides become dark. A man always expecting to fail, and peering round to find misfortune, will be sure to fail and find what he was looking for. The cholera always hunts down and seizes the fearful and fleeing.

Here in Missouri men must work to win—have courage and faith. If there is any true steel and fire in a man, the West will bring it out. If a man is made of punk and dead wood, he had better stay at home and be fed by his father, waited on by his mother, and molder along through life without doing anything for himself but waste victuals. But let the smart, the bright, the young and vigorous go in and win all the fair prizes of life, by energy, courage, industry, and force of character—all of which this State develops. Go into Missouri and grow up with the new civilization and power that will signalize it as the Empire State of the West.

SMALL FARMS THE BEST—DON'T BUY YOURSELF "LAND POOR."

The southern custom of owning a large amount of lands, and cultivating them but partially or poorly, is a wretched policy both for the owner and the State. Many men become poverty-stricken because they own so much land. They cannot improve it; they will not sell, and wish no neighbors, while the taxes are to be paid on what makes no return. Their land costs them more every year, and takes all the money which should be expended for improvements and for family comforts. A small farm will make a man rich, and a large farm may make him poor. Just what land an agriculturist can improve by tillage or pasturage is what he ought to own. Indeed, he need purchase only what he fences and cultivates. If he can improve five hundred acres, then five hundred acres are not too much; but it is a mistake, and one some have found out to their loss, to own five hundred acres and cultivate only fifty.

A small farm is all that is necessary, in most cases. It costs less, is more easily bought and sold, more readily paid for, has less fence to keep in repair, and is likely to be better improved and more productive than if large tracts are taken up, and poorly cared for and carelessly cultivated. We wish to sell our lands—not to speculators, but to farmers.

THE FUTURE OF MISSOURI.

It is not difficult to see a magnificent future for our State. If we can secure a good working, industrious, and intelligent immigration, we have all we require to build up a State second to none in the

Union. We have vast quantities of the richest land yet unsettled; we have more mineral wealth than we know of ourselves—as fine a climate as one need desire.

Missouri is tranquil and loyal, and on the line of progress. What is noblest in the form of institutions, what is most true and just in law, what most sacred in human rights, or most advanced in thought, this Missouri proposes to achieve. Already immigration is renewing the wastes of war—occupying our fertile lands, searching out our mineral riches, and pouring into the channels of the world's commerce both agricultural production and mineral wealth. There is no State that promises more certain rewards to capital and labor. The night has passed away. Free schools, free speech, a free press, and free thought, magnetized and elevated by all that is best in christian civilization, are the inevitable result in free Missouri. And the harmonious commingling of various nationalities is a happy augury of the future. We have a magnificent State, larger than England and Ireland put together. We can give work and wages to and feed as large a population as Ireland has to-day—that is, five millions. We have millions of acres of land yet untouched by spade or plow.

What may we not hope for Missouri when her resources are developed, her cities built, and her land all cultivated!

"Westward the course of empire takes its way."

NORTH MISSOURI.

Let Eastern people recall the fertile valleys of their own States, the Connecticut, Hudson, Mohawk, Susquehanna, and Ohio—think how rich they are, and teeming with wealth and population. Then remember that much of that wealth and people, with their fine cities and all the arts of civilization and science, are the fruits of the last half century. Then let them consider this vast valley of the Missouri, which lies between the Mississippi and the Missouri river at St. Joseph, and contemplate this magnificent region, through which the Hannibal and St. Joseph railroad, the North Missouri and the Platte Country railroads run, and think what it will be in a few years, when the land receives the culture of freemen—how it will grow in value, and make fortunes, as well as homes, towns and cities. Let our smart Eastern population think of these things, and now enter at the right time into this splendid domain. It is cheap now, and is offered to you on terms most generous. But when emigration comes in, as it has for a few months past, those who purchase these lands will not sell them without a great advance. Now is the time to get cheap homes, and secure a fortune for yourselves and children.

Nothing in the historical progress of other nations, in population and wealth, can compare with the just anticipations which are certain to be realized in respect to this magnificent region, of which North Missouri forms a part. It will be netted all over with a vast system of railways. It has thousands of miles of river navigation. Its capacity of sustaining a great population cheaply will attract to it the solid English farmer of moderate means, the intelligent and prudent German, the laborious and patriotic Irishman, as well as the population inhabiting the Atlantic slope.

The political power of the Union will center in these great valleys. The very magnitude of the features of the country, its magnificent lakes and rivers, and broad prairies, give a noble tone and character to the people which, with the dash and energy of western life, will result in the production of a splendid future, such as no other portion of our country can hope to have. While most of the Eastern States are burdened with local, county and State debts, nearly all the debt of Missouri grows out of the help she has given in the construction of railroads. Where, now, land is cheap, thriving cities and large towns in a few years will stand. Let him who would mend or make his fortune dip in now.

COUNTY SOCIETIES.

There are now in the State not far from forty organized county agricultural and mechanical societies, nearly all of them having held fairs the past fall. It is much to be regretted that we know so little of these societies, and have so little to record of their transactions, or of the results of their efforts for encouraging improvements. Very few have made reports to the Board of Agriculture, and only a few have been represented in the annual meetings of the board by their presidents or a delegate, as the law contemplates. These facts would seem to warrant the conclusion that such societies have regarded their fairs chiefly as pleasant holiday occasions, and have limited their efforts to the getting up of an annual fair, with little regard to the accomplishment of important and permanent improvements by other means.

It is now probable, however, that most of the older societies, which were in operation before the State Board of Agriculture was created, have failed to acquaint themselves sufficiently with the position and objects of the State Board, or have neglected to instruct their secretaries to make reports and maintain communication with the Board.

In the Revised Statutes the Board of Agriculture is placed in the same position relative to the county societies that was held by the State Agricultural Society while it existed; at the same time the privileges of the county societies have been considerably extended.

Section 6, chapter 59, Revised Statutes, provides that "There shall be held in the city of St. Louis, on the first Wednesday of December of each year, an annual meeting of the Board of Agriculture, together with the president of each county agricultural society, or other delegates therefrom, duly authorized, who shall, for the time being, be—ex officio—members of the Board of Agriculture, for the purpose of deliberation and consultation as to the wants, prospects, and condition of the agricultural interests of the State, to receive the reports of the district and county societies, and to fill, by elections, all vacancies in the Board of Agriculture."

The twelve elected members of the Board are virtually an executive committee, with power to act during the year between the annual meetings. At the annual meetings the Board is composed of the presidents or delegates of all the county agricultural societies. Four of the twelve are elected at each annual meeting, to hold their office for three years.

Section 7 of the same chapter says that "It shall be the duty of all agricultural and horticultural societies, organized and established in accordance with the laws of this State, to make a full report of their transactions to the Missouri State Board of Agriculture, at each annual meeting thereof."

The law further provides that the Board of Agriculture shall make an annual report to the Legislature, embracing an abstract of the reports and proceedings of the county societies. The Public Printer is required to print and bind the same, and a portion are to be distributed to the agricultural and horticultural societies.

Chapter 60 of the Revised Statutes relates to county agricultural and mechanical societies. Section 8 of this chapter is as follows:

"At the annual meeting of the (county) society the board of directors shall report in writing the number and the financial condition of their society, the quantity and character of the property owned by it, and the quality and cost of improvement of the same; the number and value of premiums awarded at their annual fair; the number and character of animals and articles exhibited; a statement of the probable quantity of the staple commodities of the county, and prices current thereof, and such other information in relation to the agricultural and mechanical interests of the county as they may deem worthy of general notice; and a copy of the report so made shall be transmitted to the Missouri State Board of Agriculture, to be disposed of as provided in the next succeeding section of this chapter."

The next section requires the State Board to "report faithfully all the facts, statistics, and information contained in the reports transmitted to them from the county agricultural and mechanical societies, organized and incorporated under the provisions of this chapter, and such other facts, statistics, and information as they may gather from other counties in the State in regard to agricultural, mechanical, and domestic manufactures and productions, and the raising of the various breeds of stock."

It will be seen from the questions given that it was designed that the Board of Agriculture should be the head of a system of agricultural organization throughout the State; that county societies were expected to elicit and develop information, and to collect facts and statistics of a character worthy of publication and preservation, and to report the same to the board for that purpose.

County societies organized according to law are entitled to an appropiation of funds by the county courts, to be expended in premiums, but such funds will be very poorly expended so far as the public good is concerned if they are not offered for such premiums and with such requirements and conditions as will bring out valuable facts which are worth a public record; and it may be questioned whether societies would be entitled to such funds if they fail to comply with the law in reporting to the Board of Agriculture.

The following communication has been received from the newly appointed commissioner of the Department of Agriculture at Washington. It alludes to the proper connection between the county and the State societies or boards, and the importance of the latter as auxiliary to the national department:

DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C., February 28, 1867.

L. D. MORSE, ESQ., *Secretary State Board of Agriculture, St. Louis:*

Believing that the usefulness of the Department of Agriculture and its efficiency in the prosecution of its appropriate work must depend in a great degree upon its relations with agricultural organizations, I desire, in assuming the duties of my official position, to invite your co-operation, to claim your counsel, and to tender to you my hearty sympathy in your local enterprises, and any practical help toward their successful development.

It is believed that such unity can be promoted by harmony of feeling and action between this department and State societies, as between those organizations and county societies and town clubs.

The influence of State boards and societies upon the agriculture of their respective States is already incalculably great; yet they are only in their infancy, with many difficulties to surmount and discouragements to face, and may be aided by judicious actions of this department, which may, in turn, be strengthened by associations and labor with these local organizations.

It is not my purpose to attempt to designate the modes in which this unity of action can be best attained. They will present themselves for your consideration in your daily experience; but I will venture to hint at a few obvious points in which you may always be able to advance the interests of this department and of agriculture.

You can render more successful the operations of the propagating garden in testing the merits of new seedling fruits by sending specimens of such as have attained local promise of value, for experiment in a different latitude, under varying circumstances of treatment and culture. The receipt of seeds not tested will be properly acknowledged, and all plants or seeds, when desired, will be subject to the control of the donor. Any new variety of fruit, not yet disseminated, may confidently be considered safe, and not liable to premature distribution, to the injury of the originator. You can also render valuable aid in the study of diseases of fruit trees, by sending accurate accounts of their history, progress, and effects.

The result of local observation and experiment is desired, with a statement of influencing circumstances, including especially the the hygrometric condition of the atmosphere, the dew point, elevation, shelter, etc.

For the museum (or object library) ot the department, specimens of natural history, of seeds, fruits, fibers, minerals, and products of the economic arts are solicited.

It is intended eventually to furnish State organizations with model duplicates of type specimens of their most popular fruits. The building now in progress of erection for the department will furnish ample accommodations also for a separate display and classification of products of agriculture and the minerals of the several States, contributions for which object are now solicited. It is believed that this will prove an interesting and useful feature of the museum.

In entomology incalculable good may result from correspondence relative to insect depredations, with samples of the insects for identification, description, and experiment.

The co-operation of State organizations in the collection of agricultural statistics will contribute materially to the success of department operations, and to the general fund of agricultural knowledge.

The results of local association and effort, whether of county society exhibitions, of club meetings, implement trials, sheep shearing, or other gatherings, might be presented in epitome, supplying facts that might not otherwise be so fully received, and reports in detail of special agricultural enterprise, of systematic experiments of individuals, and other occasional data, would serve to enrich the national repository of industrial facts, and disseminate generally to other States a knowledge of the peculiar resources and improvements of each.

The co-operation might, perhaps, be extended with advantage to the monthly crop returns which form the basis of current approximate estimates of growing or harvesting crops, by recommendations of the best men for reporters in those counties which cannot be represented by secretaries of their agricultural societies; and by concurrent data from other sources, and suggestions as to any peculiar or local subjects of inquiry. The idea is also presented for the consideration of State societies and State boards of agriculture of a still more intimate co-operation, involving the direction of returns to the office of State secretaries in those States, their examination and condensation, and a report of results to this department, for incorporation in the general statement for the entire country. Your views upon the above suggestions are respectfully solicited.

In return I shall always hold myself ready to answer any reasonable demand upon the resources or courtesies of the department.

I am, respectfully,

HORACE CAPRON, *Commissioner.*

It will be readily admitted that our county societies have not thus far generally co-operated with the State Board in the effort for the improvement of our agriculture to the degree that might have been done with benefit to themselves and the State at large. Societies which hold fairs of four or six days' duration, which is quite common, and yet fail to develop results and facts of importance worthy of record in the State report, may be very much better than no societies, but they fall very far short of the degree of usefulness which ought to be attained.

Much complaint has been made in late years, by the people and the press, that county fairs are converted mainly into "agricultural horse trots." There has been too much reason for such complaint.

Let liberal premiums be offered for the best cultivated and best managed farms; let competent committees be selected to visit the farms offered in competition, and to make a report of their observations, with reasons why one method is better than another, etc., and more real good will be accomplished, provided the report is published, than by the payment of "grand premiums" for the fastest trotters.

The present purpose, however, is not so much to point out the various ways in which improvements may be effected in the management of our county societies, as to indicate the importance of seeking for improvement.

There are intelligent farmers enough in the societies to find the ways and means for effecting important improvements, provided they determine to do so.

We wish to remind county societies that the State has made provision for the publication of the more important results of their labors, in a shape which will be not only for their local benefit, but for the benefit of the State at large; second, that it is the privilege of each county society to send its president or a delegate to the annual meetings of the State Board of Agriculture, on the first Wednesday in December. It is easy to see how such an annual gathering of the presidents of county societies in convention may be in a high degree profitable. It seems very plain that societies which have for their leading object the best improvement of our agriculture, should avail themselves of the advantages indicated. If the leading object is to hold a fair for the fun of it, or for a pleasant holiday, the case would be somewhat different, and it could not be expected that such a society would develop much information that would be worth publishing.

L. D. MORSE,
Corresponding Secretary.

COUNTY REPORTS.

AUDRAIN.—M. F. SIMMONS.

Agriculture is the mother of arts—most ancient and most universal—most delightful, healthy, and remunerative in its investigations! However well one may be educated in antique lore, or in modern science and theory, if he have not a knowledge of and love for the pure science of agriculture, he is educated amiss, and the avenues of his soul are closed to myriads of thoughts and suggestions, both instructive and pleasing, which otherwise come to cheer and happify life.

Of all departments of business, agriculture is most liberalizing in its influence. Where than among the farmers of our country exists greater consistency of opinion and freedom from prejudice? Where prevails greater social amity? for there is little to foment discord and engender strife. And where, amid any class, prevails greater hospitality, with equal independence and happiness?

The estate of a farmer is a state which charms us; and we hie from the din of business, from the incarceration of office walls, from "the lawyer's quibble and the critic's cant," from points and briefs, and dusty tomes of half-forgotten legal lore, to breathe a wholesome rural atmosphere—to roam mid bleating flocks and lowing herds, mid groves and fields, and see the bosom of earth, under the toilsome hand of skillful industry, yielding an abundance to supply the wants of animal life.

But this report must contain less of idle soaring and more of plain and direct statement concerning the agricultural history of Audrain county for the past year.

Judging from surface manifestations, 1867 has not been a prosperous year to our county; and yet the lessons of trial and hardship which we have experienced may prove lessons of profit and wisdom not soon to be forgotten by our citizens.

A severe and unparalleled drouth has prevailed; but little rain has fallen since the early part of June last, and in a section where few springs and living streams abound, where domestic supplies of water depend on cisterns alone, and supplies for stock on ponds and wet weather streams, every inconvenience and want that so long a dryness might possibly occasion has been felt. Yet, nowhere has nature done more, that man may furnish himself abundant and lasting supplies of water, than in this portion of Missouri. The sagacious are taught that more ponds and larger cisterns, and a more scientific course of agriculture, will prove an effectual safeguard against all evils of prolonged drouth.

Another lesson taught is the necessity of fall plowing, that sowing and planting may be done at an earlier day in spring. This custom has not been much in vogue in the past, though autumn plowing has this year been done to a greater extent than ever before. Spring is commonly quite wet with us, and as no plowing has been done until then, sowing and planting have not been accomplished till very late. The tender growth is early overtaken by the heat and drouth of summer, and the crop is either lessened or ruined.

The necessity of *deep* plowing is also taught. Shallow plowing is one of the worst faults which our farmers have to overcome—it has been the bane of all successful agriculture in the past. When the plowing is but shallow, the roots of vegetation ramify only the immediate surface, where growth is injured by small drouths and destroyed by severe ones. By subsoiling or trench-plowing the earth is loosened up to a considerable depth, more moisture is received and longer retained, and the roots of vegetation descend so deep as to remain almost unaffected by any drouth which nature can send against us. Instances are quite numerous where the enterprising farmer, by plowing deeply, raised fifty bushels of corn per acre, while in the adjoining field his old-time, slow-coach neighbor, by shallow plowing, did not raise one-half of that amount; and one instance where, with trench-plowing, sixty bushels of corn per acre has been grown this dry summer, while the average yield is not more than twenty bushels.

Still another and all-important lesson taught is to depend less on a single crop, but to have a greater variety, growing at different times, and not depend for our entire supply on the weather-freaks of a particular season. Corn has been the great staple crop, and when it failed the loss was heavily and widely felt. Oats, barley, and the grasses must be grown as spring crops, and more wheat and rye sown in autumn. These may always be raised in paying quantities, and in particularly favorable seasons be made largely profitable. "It is best to have two strings to one's bow."

Fortunately, a far greater breadth of the spring grains was sown the past season than usual; they were of overwhelming yield, and a redeeming item in our account of supplies produced.

The earth never groaned under a more oppressive weight of the grasses than burdened it last spring. Meadows were especially excellent; the fault is that they are so few.. Our farmers should much increase the area sown to the tame grasses. When properly seeded, our wet springs always grant a policy insuring two to three tons of hay per acre. Our farmers are beginning to appreciate the value of blue grass for winter pasturage, and are sowing it extensively. It grows most luxuriantly, rivaling the famous blue grass regions of Kentucky.

Wheat did finely last season—affording a yield of nearly or quite twenty bushels per acre on the average. Audrain is yet to occupy a front position as a wheat-raising county. Judge Norman Lackland, of our county, received the first premium on wheat at the St. Louis fair—quality being excellent, and the quantity thirty-two bushels per acre. Our agricultural society and farmers' club have each offered liberal premiums, amounting in the aggregate to seven or eight hundred dollars, for the best crops of wheat. This is expected not only to stimulate the raising of wheat, but also to stimulate to more scientific preparation and culture, of which there is vast need. Early sowing and drilling in are the great secrets of successful wheat growing.

Fruit growing is greatly on the increase. The rage for engaging in it amounts almost to a mania with some. We already have some fine young orchards of twenty to forty acres each, and there really is no consistent reason why their area should not be extended. Fruit trees do excellently on our prairies—are healthy, vigorous, and productive. The rich soil affords a speedy growth, and they are brought into bearing at an early age. Our peach crop has been a total failure for two successive seasons—occasioned by the extreme cold weather each winter. Small fruits, however, have been quite abundant, of most varieties; strawberries especially were of overwhelming yield

Osage orange, for fencing, is claiming much attention. Scores of miles were set last spring, and not many years hence will see every improved farm in our county inclosed and subdivided with Osage hedges.

The farmers of our county are fast to catch the spirit of the times. They may be called enterprising; and this quality, to a great extent, is attributable partly to the abolition of slave labor and partly to association with farmers of other States who have immigrated to us during the past two years. Each man who comes brings with him some of the improved notions and habits of farming current in the locality from whence he emigrated; these, blended with a knowledge of the climate and the capacity of the soil possessed by older residents, creates an intelligent appreciation of the best means and ends, and will assuredly place us in the foremost rank as agriculturists. Whatever is new and valuable, and whatever plan, under thoroughness and skill, has wrought success to others, is adopted with avidity. Improved machinery is becoming extensively introduced, and gang plows, sulky cultivators, corn planters, and reapers and mowers are considered indispensable by farmers of means and enterprise.

Immigration to our county has not been very heavy during the past year, though several thousands of the sturdy yeomanry of other States have taken up their abodes with us since the close of the war; our population having increased from six thousand, two years ago, to more than ten thousand now. Our flourishing young city, Mexico, has now a population of three thousand five hundred souls, and the number is rapidly increasing. We are in lively anticipation of a new line of railroad, extending from Louisiana, on the Mississippi, to Mexico, and probably on toward Kansas City.

We have in operation an active agricultural society. Our fair in October lasted six days, was visited by as many as ten thousand people in a single day, and was called, by those who claimed to know, the best exhibition in the State outside of St. Louis.

In June last, Mr. O. A. A. Gardiner, an intelligent and enthusiastic horticulturist, had the enterprise to start the publication of the Horticulturist and Farmer, a semi-monthly issue, devoted mainly to the interests indicated by its name. We are sorry to acknowledge both a want of interest and a direct hostility to the project by many of our own citizens, and it has been removed to DeSoto, Jefferson county, where, we rejoice to learn, it has received a cordial welcome.

I must not conclude this report without calling attention to one or two departments of farming which have received limited or no attention in the past, but which bid fair to prove great successes, and be elements of much wealth—I mean cheese making, or dairying, and sheep husbandry. Several northern families have been engaged in the former business during the past year. The result has been entirely satisfactory—exceeding the most sanguine hopes. It is plainly conclusive that good cheese can be here made for one-half the price at which it can be obtained from the East. Scores will be stimulated to engage in dairying and cheese making another year.

Sheep husbandry is fast becoming a leading business with us. Many thousand head of merinoes have been brought into the county during the last eighteen months. Our rolling prairies, and the dry, pure atmosphere of this particular region render sheep healthy, and make it unsurpassed by any region within my knowledge. Notwithstanding the qualities already mentioned, together with a mild climate, brief winter, plenty of free range, and the best of blue grass for winter pasturage, not all who have engaged in sheep raising have succeeded. A man may be successful with fifty sheep, and otherwise with a flock of five hundred. Experience and skill are essential, and any one who attempts to manipulate 500 or 1000 sheep without much previous experience in their care and management, is almost certain to signally fail in the attempt. There is, to the novice, no more difficult science connected with agricultural industry than to attempt the proper care of a large flock of sheep; sagaciously managed, there is none more profitable.

BENTON COUNTY.—John Cosgrove.

Deer Creek, *December* 11, 1867.

Dr. L. D. Morse—*Dear Sir:* Your note of the 6th ult., asking for a report on the productions, etc., of Benton county, by some delay of the mail, was not received until the 1st instant, and as the time is limited, and not having an oportunity to refer the subject to some person more competent, I have thought it best to give you a brief report of such information as is within my knowledge.

Benton county is situated in the southwest central part of the State. The general character of the county is broken, about one-third being undulating prairie (the north portion). The remainder is rough timber land. The soil is of almost every kind to be found in any country, from the richest alluvial bottoms to the gravelly black jack and flint ridges.

The water courses of the county are the Osage river, Grand river, Pomme de Terre, and Big and Little Tebo, Cole Camp, Turkey, Flat, and Deer creeks. We have a county which is abundantly watered. The Osage river is navigable for a good portion of the year as far west as Osceola, in St. Clair county, twenty-five miles above Warsaw.

There is abundant supply of the best varieties of timber—enough to supply the county for all ages to come, if properly taken care of, which is not done. Black, post, pin, white, burr, black jack, and chincapin oaks; white, black, and gray hickory; black and white walnut; sugartree and maple; sycamore, hackberry, honey locust, red and slipery elm; white and blue ash; cottonwood, buckeye, wild cherry, red cedar, and mulberry. The oaks are the most numerous. Our shrubs our hazle, black and red haws, sumach, persimmon, sassafras, pawpaw, service berry, dogwood, spicewood. Several kind of plums, prairie rose, elder, crab apple, blackberries, dewberries, and raspberries are abundant. Wild grapes are very plentiful, and some varieties are excellent for table use. We have wild strawberries, raspberries, dewberries, and blackberries in abundance in their season.

The number of acres assessed in the county for 1867 is 355,349, valued at $1,995,370. There are about 75,000 acres of vacant or government land remaining. Most of it is of a poor quality, but under the homestead act it is rapidly changing hands from Uncle Sam to the poor but thrifty farmers from the more populous Northern States, who are filling up this portion of Missouri rapidly. About 75,000 acres belong to non-residents or speculators, much to the detriment and prosperity of the county, as a great many tracts of these lands lay along our creek bottoms and on the best prairies, and are the most valuable lands we have for agricultural purposes. There are also many tracts of land entered for their fancied mineral value, nearly all of which remain undeveloped.

The price of land is a hard matter to determine, as nearly all depends on the improvements. Good prairie land, with moderate improvements, can be purchased for ten dollars per acre. Some favorite locations are double this amount. Unimproved prairie land, of good quality, can be bought from four to six dollars per acre. Land is improving in value very rapidly, owing to the large tide of emigration which has been coming into this county since peace has been restored.

The pasturage of the county is excellent. Whether on the gravelly hills or on the rich prairie, you meet with the same luxuriant growth of rich native grass. This grass, if cut in proper season, makes an excellent quality of hay, and stock does well on it through the winter.

The principal productions are corn, wheat, oats, rye, buckwheat, potatoes (sweet and Irish), tobacco, sorghum, and hay. Fall wheat is principally sown, and yields from fifteen to twenty-five bushels per acre This depends on the method of preparing the ground. Where farmers summer fallow their land, the product is nearly doubled. Corn yields from thirty to seventy-five bushels per acre, according to the season and the system of cultivation adopted. The yellow corn is considered the most nutritious and valuable for fattening purposes, and is, therefore, generally fed to stock, it being the easiest way of disposing of it. The other cereals are raised with good success, but on a more limited scale.

Stock raising is the principal object of farmers. Horses, cattle, sheep, and hogs are raised in large numbers. The number of horses in the county is 4128, valued at $246,465. Cattle find a ready sale through the summer and fall by drovers from different parts of the west. The number of neat cattle in the county is 13,044, valued at $173,125. Sheep are owned by nearly every farmer, in flocks from five to five hundred, and raising sheep is considered one of the most profitable employments a farmer can be engaged in. They are generally of the scrub or common kind. Other breeds have been introduced, but are not in much favor. This is owing to the fact that we have no carding machine in the county suitable to their fine fleece, and as nearly all the wool is used for home consumption, in making jeans, lindsey, etc., it will be some time before there will be much improvement in the stock. The number of sheep in the county is 14,771, valued at $23,525. Cattle are receiving more attention than usual. Several kind of the improved breeds have been introduced, and are rapidly taking the place of the scrub stock. Among the principal men engaged in the business, I will mention the Hon. R. H. Melton, of Warsaw, Lemuel Drake, and Judge H. H. Han.

Mules are raised in considerable numbers, but lately find a poor market. The number in the county is 930, valued at $61,140.

Hogs are raised in sufficient numbers to supply home demand, and are a mixture of the scrub and all the improved breeds. The number in the county is 15,142, valued at $41,275.

Mills are not in sufficient numbers to supply the demand of breadstuffs for home use. There are four water and four steam mills in the county. They are all grist and saw mills. At least one half of the number may be set down as nuisances, and do not deserve the name of mills.

Fruit growing is receiving more attention than usual. There have been more young apple orchards set out the last two years than have been for twenty years previous to the rebellion. Western raised trees are preferred.

There is considerable improvement in agricultural implements of late. Nearly all the various modern patents have been introduced—plows, reapers, and mowers, all of which have proved quite an acquisition to the old style. Threshing machines of a superior character have been introduced also.

In conclusion, I must say that the system of farming practiced in the county has improved rapidly the last two years, although it is greatly below an average yet. No underdraining nor subsoiling has been done to my knowledge yet. The plea is that it will not pay while the land is so fresh and plenty; but time will force a better system to the homes of many, and that before long.

BUTLER COUNTY.—J. W. BALDWIN.

Butler county lies in the southeastern part and on the southern boundary of the State; it is bounded on the east by St. Francis river, on the south by Arkansas, on the west by Little Black river, Ripley and Carter counties, and on the north by Wayne county; it is about thirty miles in length from north to south, and about twenty-five miles from east to west, containing about seven hundred and fifty square miles, and a little less than five hundred thousand acres of land, about four hundred thousand of which is susceptible of cultivation, and a large portion of the remainder well adapted for orchards and vineyards.

The surface of the southern part of the county is level, of a black rich soil, in places slightly mixed with black sand, and easily cultivated. The north and northwestern part of the county is broken, consisting of large fertile valleys, poor ridges, and fair upland. The county seat is Poplar Bluff, beautifully and pleasantly situated on a slight elevation at the head of navigation on Black river.

Black river is the largest stream running through the central portion of the county, from north to south, navigable as far as the county seat. Strange as it may seem, and yet no less strange than true, by the prudent expenditure of a little capital (little, I repeat, because it would be so little compared with the advantages, conveniences, and profits which it would produce) in the extension of the St. Louis and Iron Mountain railroad to Poplar Bluff, the head of navigation on Black river, and in the improvement of said river (the latter is now under contract, and will perhaps be completed next season), St. Louis would have a direct southern trade at all seasons of the year, unobstructed by ice or other causes, passing through an almost inexhaustible forest and mineral region, and over a soil and through a region of country capable of producing a vast amount of the necessaries, comforts, and luxuries of life, and also a large amount of stock for market, to supply countries less favored by a benign Providence; this done, and this would be one of the wealthiest and most desirable counties of the State.

St. Francis river is the next in size, being from one hundred to one hundred and fifty feet in width, washes the entire eastern boundary of the county, and affords sufficient water to convey to market the immense and valuable forest with which its fertile valley is densely covered.

Little Black river is the next in size; it washes the southern part of the western boundary of the county, large enough to float small rafts, and affords abundant water and good sites for mills, factories, etc. There are numerous other smaller streams, some of which afford sufficient water and have good sites for mills, factories, etc.

Timber.—Oak is most abundant; black oak, white oak, post oak, burr oak, and cow oak. Cypress and poplar of the finest quality also grow in great abundance along the numerous streams; white and black hickory, black and white walnut, sugartree, sweet and black gum and elm, and in the northwest part of the county an abundance of fine pine, besides various other kinds, less abundant in different parts of the county. Hazel and pawpaw are abundant, and many other numerous kinds, such as sassafras, red bud, black and red haw, and willow.

The wild grape is the vine most abundant, yet there are many other kinds to be found.

Wild fruits and berries are numerous. The principal are haws, plums, hazel, walnuts, and hickory nuts; of berries, we have blackberries in great abundance; also dewberries, gooseberries, huckleberries, etc.

There is some land still owned by the Government. I have no means of knowing the amount, but suppose several thousand acres. There are also a few thousand acres belonging to the county. Improved land can be bought from four to six dollars per acre; unimproved from two to three dollars per acre.

Iron ore of the finest quality is supposed to exist in great abundance, but for the want of capital and railroad facilities has not been worked. It is generally believed that lead ore exists in paying quantities; and a few persons who have made some examination are sanguine in the belief that gold and silver will yet be found here.

We are in great need of mills; there are many good sites for both steam and water mills. We have no foundries or factories—not even a carding factory, which is greatly needed, and would amply remunerate the owner.

Threshers are used with good results. Our farming implements are of the most ordinary kind, consisting of little else than the common plow, hoe, and harrow; no reapers, mowers, corn planters, or cultivators, etc.

There are only about ten thousand acres in cultivation, and about two thousand five hundred inhabitants in the county.

The principal products of the farm are corn, wheat, oats, and hay. Wheat, when properly put in, on good wheat land, will produce from ten to fifteen bushels per acre; fall wheat is universally cultivated. Corn, on good corn land, properly cultivated, will yield from thirty to fifty bushels per acre. Oats grow well. But little attention has been paid to hay, and yet but few if any counties are better adapted to hay than this.

Tobacco grows well, and a very fine article may be produced on the uplands.

Potatoes, sorghum, turnips, and almost all kinds of root vegetables and grains common to this latitude, when properly cultivated, grow to great perfection; and but few localities will produce so abundantly so many of the necessaries, comforts, and luxuries of life, in the way of food as this; while the rivers and smaller streams abound in fish, the forest in game, and the aerial regions in birds of sweet song and beautiful plumage.

Sheep are kept in flocks from five to twenty—a few larger. They are with few exceptions of the common kind—all do well. Wild pasture abundant, well adapted to the raising of large flocks at little expense.

Hogs are mostly of the common kind. The great abundance of acorns, and the rich uncultivated soil, enable farmers to raise a great many hogs at a very small cost. Hogs have died of disease in great numbers during the present season.

Cattle are generally of the scrub breed. Summer range for cattle abundant, and good winter range in southern part of the county. Cattle can be raised at little cost.

Horses and mules are of the common breeds, and, like other stock, do well, and can be raised at a little cost compared with the cost of raising them in other localities less favored by nature.

A great part of the farmers are raising small orchards for their own use. Both peaches and apples do well.

We have no vineyards, but they would certainly do well. Wild grapes grow in some parts of the county in great abundance and of good quality.

In conclusion, I would say that our county has an immense forest of timber of the finest quality, with streams sufficient to convey it to market. It is also well adapted to the raising of stock, being well watered; and an abundance of wild grass, thousands of tons of which annually dry up and serve no other nor better purpose than to feed the flame and burn up the green grass and acorns, could be profitably converted into wool, mutton, beef, butter, cheese, etc.

Much of the land is excellent for corn, wheat, and vegetables, while some is better suited to hay, and others to orchards and vineyards. All things considered, this county has timber, soil, wild grass, and mineral enough, when fully developed, to make it among the wealthiest of the State.

What we need most is pious, educated, industrious, and enterprising men to educate, refine, and improve society, and to develop the natural resources of the county.

Immigration into the county this season has been very large, and, I hope, of the right kind. We say come on! there is room for many more yet; we need preachers, school teachers, lumber dealers, mechanics of various kinds, farmers, and men to build mills and factories.

This season has been very unfavorable, spring excessively wet, and summer and fall remarkably dry.

CAPE GIRARDEAU COUNTY.

Organization of the county, etc.—Cape Girardeau county is one of the oldest counties in the State, having been organized as early as 1821. It is situated in that part of the State known as Southeast Missouri, bordering on the Mississippi river, fifty miles from the mouth of the Ohio river, its latitude being 37° north. Cape Girardeau county contains an area of about three hundred and fifty thousand acres, about one fifth of which is under cultivation. It was originally settled by the French, who for many years made but slow progress toward improving it. Since that early period quite a large number of Germans have settled here, and many from the older Eastern and Southern States, who added considerable to its growth and prosperity, notwithstanding the blighting curse of slavery and its attendant evils did much to retard the advancement of the material interest of the people, more especially so in point of education, enterprise, and intrinsic worth.

The county may be very properly termed a "new old county," being comparatively young in the development of its resources, while a large extent of its surface has been cleared and brought into a state of semi-cultivation. Thus it enjoys the advantages of a new county, while it has the benefit derived from an old settled one. The size of the farms range from forty to three hundred acres; occasionally there may be found one of a thousand acres, but the county is composed generally of a large number of small farms, a large proportion of which are offered for sale upon very low terms; and perhaps it may not be amiss here to state the reason of so many farms now being offered for sale; it is simply this: There is a clause in our new constitution which disfranchises all those persons who have been engaged in the late rebellion against the Government, as well as those who have ever given aid or comfort to its enemies, and even those who have had or expressed sympathy for them. This, it will be observed, has a sweeping effect, not only depriving many from exercising the privilege of voting, but goes further—preventing them from ever holding any office of honor or trust, either State, or municipal, or in any corporation, etc. Heretofore many of the persons coming under this class believed that this offensive portion of the new constitution would be expunged, or declared by the Supreme Court of the United States as unconstitutional, and they would be restored to their former condition as citizens; but they have now almost universally given up that hope, and many have determined to remove to a more congenial locality—one in which they can enjoy the privileges and immunities of citizens without let or hindrance.

Population, etc.—Cape Girardeau county contains at present a population of nearly twenty thousand souls Among the towns and villages may be mentioned Jackson, the county seat, Appleton and Pocahontas, in the north portion of the county; Millerstown, Oak Ridge, in the northwest, and Henrichville in the southwest corner, and the city of Cape Girardeau or Marble City, as it is frequently called, deriving this name from the fact of its being located on a solid bed of marble. A more complete description of this city will be given hereafter.

Geographical situation, etc.—Cape Girardeau county being situated, as it is, south of the extreme eastern spur of the Ozark mountains, obtains a quality and diversity of soil unsurpassed, peculiarly adapted to the successful cultivation of cotton, corn, grasses, tobacco, all the varieties of the cereals, and more especially that of fruits, grapes, etc., which are never injured by the freezing of winter; in short, there is no better fruit-growing county in the world for fruits adapted to this latitude. Nearly all of the minerals of the United States are found here, and many of the precious metals. However, the mineral as well as the agricultural resources of the county, are almost wholly undeveloped, owing in part, perhaps, to the want of facilities for freighting, and the want of encouragement by the people to capitalists, who would have unfolded, long ere this, much of the vast mineral wealth of the county, thereby inducing the intelligent, industrious, and scientific farmer to improve the soil, as it is capable of being improved, and make this county what it is justly entitled to be. The last two years have wrought a great change in some localities in the county; farms which were allowed to grow up in briars, fences to rot down, buildings neglected, and which presented the most uninviting aspect, have gone into the hands of eastern farmers, and will now compare with the model farms of the East. This county was originally covered with a very heavy growth of timber; the timber consisting chiefly of poplar, oak, walnut (white and black), cypress, pecan, hickory, sugar maple, elm, ash, and hackberry; the smaller growth consisting of pawpaw, red bug, dogwood, ironwood, and white thorn, etc., and large wild grape vines of several varieties.

About four-fifths of the area of the county is susceptible of the highest state of cultivation, the remainder being suitable for pasture, portions of which are well adapted for the culture of the vine and fruits of all kinds, etc. The surface of the county is both level and undulating, the undulations generally being gentle. The soil of the upland is a friable, finely comminuted loam, of a yellowish color, consisting of fine siliceous sand, clay, oxide of iron, carbonate of lime, with minute proportions of phosphate of lime and magnesia. This soil is a "diluvial," containing little organic matter, with an occasional substratum of alluvial deposit, much of it deriving its fertility chiefly from the emanations from the subsoil and the atmosphere. (This, however, is only an opinion.) The soil of the level or bottom lands is a dark alluvial, intermixed with sand and decomposed vegetable matter, and for fertility cannot be surpassed anywhere.

Streams, water power, etc.—Cape Girardeau county abounds with streams of clear running water. No sluggish streams are found here; on the contrary, they have very rapid currents, being fed by innumerable springs, thus affording the most excellent water power. These mill seats are furnished with abundance of water the whole year—but little affected by continued drouths, and never affected by freezing in winter. Numerous magnificent springs are scattered over the whole county, well suited for dairy purposes, and furnishing water for stock. Scarcely a farm is to be found upon the uplands but what has one or more. The water is generally impregnated more or less with lime, with occasionally a spring of soft water as pure as that which comes from the heavens.

Health, etc.—The healthfulness of this county is generally conceded, by persons having a knowledge of it, to be good, notwithstanding the general impression given to it by parties interested in other portions of the State, and especially interested in the development of North Missouri. 'Tis true, in some localities the inhabitants suffer from chills and fever, in the latter part of summer, but in nearly every instance of this disease it can be attributed to carelessness and improper living. Persons who live in strict accordance with hygienic laws are seldom affected by these miasmatic maladies, and if affected by them at all it is very slightly, the disease being generally of a mild type. The diseases incident to this county are principally those having a miasmatic origin. The more malignant or fatal diseases are rarely met with. It is well known that all countries that are not thoroughly opened up and improved, in all climates, are more or less affected by malaria; hence, as this county is opened up and cultivated, these miasmatic diseases will disappear, to be replaced by more specific diseases of older sections. It is remarked by intelligent and observing persons, who have resided here for a number of years, that there is a noticeable improvement in this respect every year; which is doubtless true, as it is well known that chills and fever was a common disease in many of the Eastern States a few years ago, and at present they are entirely exempt from it. It is not the design of this association to misrepresent this county in any particular. It is not composed of a set of "land sharks"—and the directors would shrink from the thought of deceiving their fellow citizens upon a point of such vital importance to them and their families, lest the curse of the Almighty be brought down upon this now divinely-favored county. But of one thing we can assure the public, with a consciousness of being correct, "that this county is equally as healthy as any found upon the banks of the lower Mississippi river, and more healthy than any on the east bank of that river." We say more: "Our mortality list will compare favorably with that of any other county in the West." Our miasmatic diseases being of a mild type, there is less mortality than where they are of a more malignant character, or where the diseases have a more specific origin.

Climate.—In regard to the climate of this county, of its geniality and peculiarities, much might be said, but we will content ourselves by simply stating that it is semi-southern, having but few sudden changes, and then the variations are but a few degrees, the thermometer seldom indicating a temperature below zero. For the past two winters it has not been below 12° above zero. In summer the mercury seldom rises higher than 90° in the shade. Soon after nightfall a gentle southern breeze springs up, which makes it pleasant and refreshing to sleep, thus cooling the heated earth and causing heavy dews to fall, which are almost equal to showers of rain in their invigorating effect upon vegetation.

Political status.—The political status of the people of this county, prior to the war, was pretty equally divided between the loyal and disloyal. There were many conditional Union men, some unconditional Union men, and *quasi* loyalists, and secessionists, with not a few open and avowed secessionists. After the clash of arms resounded through the country, and men were called upon to take a decided stand, either for or against their government, a large majority flocked to the Union standard, and many of those who, at that critical period, were halting between two opinions, now look upon it as being the proudest moment of their lives when they concluded to array themselves beside the loyal men of the nation and battle for the right; while a majority of those who went over to the enemy now curse the day they so wickedly deserted their country's flag and joined hands with the defunct Southern Confederacy. Much credit is due and given the Germans of this county for the noble stand they took from the commencement of the rebellion, and their loyalty to the flag of their adoption. This German element was the nucleus around which the loyal party formed, and which, doubtless, prevented the county from being betrayed into the hands of its treasonable enemies, which would have resulted in the destruction of much valuable property.

It may not be amiss, in this connection, to give a statement of the present political tendencies of the citizens of this county. The radical Union party gave a majority of four hundred and thirty-four votes at the election of 1866. The county election last fall resulted in the election of radicals for all the county offices, by majorities of from two hundred to six hundred votes; thus it will be seen that this is a radical county. Many persons unacquainted with the social condition of this section of Missouri, are laboring under the erroneous impression that there is still much strife and discord existing among the people, and that the person and property of northern Union men are not respected and secure. To all such we confidently reply: Your person and property are as respected and secure here as in any of the

Eastern States. It is admitted by all that there is less disorder and violation of law here than there ever was at any period of this country's history, even before the war. Now this may seem strange to a country just recovering from the scourge of an intestine war, but it can be easily accounted for in this wise: The civil war afforded an excellent opportunity for all the low and desperate, with all the thieves, robbers, and murderers of the country, to ply their vocations of theft, murder, and robbery under the guise of soldiery; hence they formed themselves into bands of bushwhackers and guerrillas, and plundered the country and the inhabitants until it became unindurable, and they were hunted down by the Union troops and killed wherever found, the result being that there are but few of them left to tell the tale.

A new era dawning.—Besides this thinning out process, there is a new era beginning to dawn in this hitherto semi-unknown region. The people are becoming favorable to a liberal education of the youth and the dissemination of religious influences over the land, and many of the old fogies are now lending a helping hand to those who are in favor of progress and improvement, with a commendable zeal. Truly it may be said: sad lessons have been taught to many of the oligarchists of this section—lessons that will never be forgotten by them. It may be asked by persons who contemplate coming to this county, if there is not considerable prejudice against Yankees or northern men? We candidly confess there is a little, but it is only those who are in bad odor here themselves who are opposed to northern immigration. There was formerly considerable prejudice manifested by the more respectable class of southern sympathisers, but it has now nearly all disappeared, and, on the contrary, many of them are now more favorable to anything that will promote an influx of intelligent, enterprising men in the county, openly declaring that they believe it to be the only salvation for the county, in order to secure a full development of the rich resources, and especially essential to the early completion of the railroad leading from Cape Girardeau to the Iron Mountain. It is a satisfaction to know that so many of these fossils can realize the necessity of more energy and enterprise, combined with intelligence and capital, in order to make this county what it should be, and what it would have been long since, had it not been for this very fogy element, which is now fast being rooted up. Still, with all the disadvantages this county has labored under, she stands sixth in population and wealth, and with an equal per cent. of increase (such as from 1864 to 1867) she will stand third, if not second, in the State. We would say to all good citizens of every locality, in whatever country born, if you desire to come west, and find a locality where you can enjoy all the comforts of a genial clime, one which is well adapted to all the pursuits of life, and especially fruit growing, stock raising, and the culture of vine, come this way.

The city of Cape Girardeau, situated in the southeastern portion of the county, upon a moderate elevation, overlooking the Father of Waters, is noted as being the metropolis of the southwest. It enjoys a very extensive commercial trade, extending a distance of two hundred miles to the southwest. Nearly the whole of Northern Arkansas pays tribute to the Cape, it being the great shipping point for them. The landing for steamboats at this place is one of the best on the lower Mississippi river, the shore of the river consisting of a solid wall of marble, which is easily brought to the proper grade for levee purposes. The whole city is above high water mark, which is not the case with any other point upon the west bank of the river, between this and Baton Rouge, Louisiana—all other places situated on the west bank of the Mississippi being subjected to a continual washing away of the banks, and an annual overflow. The facilities for manufacturing at this point are equal, if not superior, to any in the West, and especially so for the manufacture of iron, agricultural implements, and furniture. Iron ore is found in this county. The "Muddy coal banks" are only twenty-five miles up the river, which produce a quality of coal equal to that of Pittsburg at the same cost. Cape Girardeau, or Marble City, has a population of about five thousand inhabitants, consisting of quite a large German element, who are noted for their frugal and industrious habits. There is now a free graded public school in successful operation in the city, besides a college and convent under the control of the Sisters of St. Vincent.

Fruits and vines are produced in abundance. The most elevated portions of the upland furnish locations were the peach has as yet never failed. In the valleys, and along the northern slopes of the uplands, apples, when properly cared for, yield large returns. Pears, plums, cherries, quinces, currants, etc., fail not each year to return a crop in proportion as valuable as the labor expended upon them. Latitude, climate, influences, and the various formations of the soils, make this locality truly the home of the grape. The wild grape, with its profuse net work of vigorous vines interlacing the forest trees, yearly laden with rich clusters of Nature's purple wine sacks, gives to our forests a charm that is not often met with; while the numerous vineyards everywhere found on the uplands (southern slopes) prove that every valuable cultivated variety, among which are the following: Delaware, Concord, Virginia seedling, Ionia, Hartford prolific, are not only profitable, but are yet destined to become of great commercial value to our county. The vine is increasing in favor, and each year acres are being planted in the strongest belief that the product in wine will be more valuable than that from any other crop. Fruit of all kinds ripens in average seasons fully four weeks earlier than at St. Louis, thus affording the great advantages of high prices that always are received for the first fruits in the northern markets. The fruit grower can find no better locality where his labors will bring him greater returns, nor are all the advantages for his business so generally united to be found elsewhere in the State.

Price of lands in our county varies from one to forty dollars per acre, while that adjacent to the city often reaches one hundred dollars. The further we pass back the less its price. The improvements in most cases consist of a hewed log house and barn and other outbuildings, farms usually inclosed by a good rail fence, fruit trees of a few varieties, some select, but generally common, and but little taste displayed in the arrangement of orchards, gardens or yards. Where the improvements are of the first class, nothing can be more delightful than to notice how perfect nature and art join to make home so beautiful. The best proof we can urge for the productiveness of the soil is the returns now received from such a very indifferent mode of farming.

Schools, etc.—It may be safely said that by the beginning of the next school year every township of our county will be thoroughly organized under the statute provisions of the recently amended school law. This being a matter of grave importance among those desiring to come west, nothing is more satisfactory to us than so perfect a promise that here may be enjoyed all the benefits arising from the perfect operation of the public school system. Educational advantages are not wholly confined to the public schools; for we enjoy all the benefits to be obtained from an extensively patronized college, both theological and classical, and a young ladies' seminary, under the patronage of the Catholic church, as well as other denominational high, select, and private schools. By the proper observance of our recently amended school laws, there can be no doubt that everything will be accomplished necessary to make the public schools of the county second to none in the State.

Not only are the ordinary branches required to be understood by every teacher, but a strict compliance with all the requirements as set forth in the "iron-clad" oath of the constitution of the State. These matters combined will very soon create a demand for intelligent, practical, and unconditionally loyal teachers. As early as the beginning of the next school year such demand will be felt. Improvement in every particular is observed in schools. The heretofore false systems of educations are becoming obsolete, and the youth of our county are learning that to think for themselves is an accomplishment more worthy than forever having irresponsible demagogues their oracles. Truly a new era is dawning upon us. The public schools, both of our city and towns, are successfully established, and now unfettered by prejudice or caste; every one, be they of any nationality, may receive at the hands of the public a liberal education. The birthright of every American citizen is now felt and exercised, and the fundamental principle of our government, that intelligence is the life of liberty, is rapidly sweeping away that fettered ignorance that fed a false and pedantic aristocracy. Every avenue to knowledge is now open, and every one may fully enjoy its substantial benefits.

GENTRY COUNTY.—C. G. COMSTOCK.

Gentry county lies in Northwest Missouri, and is a part of what is known as the "Grand River Country." It is twenty-four miles long by twenty and a half wide, is well watered by the three branches of West Grand river and their affluents, and has an abundance of timber lying on the projected line of the St. Louis, Chillicothe and Omaha railroad; it has an almost absolute certainty of a speedy railroad connection with St. Louis, Chicago, and the great Pacific railroad. Albany is the county seat.

The county has a population of about 9000 people, and numbers rapidly increasing. Only about one-tenth of the county is under fence, and full one-half is owned by non-residents. Unimproved prairie sells at from $2 50 to $6 50 per acre, and timber at from $5 to $25 per acre, all depending upon quality and location. Improved farms sell at from $10 to $20 per acre.

Coal is found in at least three localities, but has not been developed. Stone is abundant in most parts of the county. Traces of copper were reported by the State geologist on his survey, but none found that has been heard of.

The soil is a black loam, averaging about twenty inches in depth, with clay subsoil, and withstands drouth and wet equally well.

The climate is remarkably healthy, especially for weak-lunged people, owing probably to the dryness of the atmosphere in the winter season; during the growing seasons there is usually no want of rains, and in the course of a nine years' residence the writer has seen but one serious failure of crops: that was in the year 1860, when the drouth was general. Last summer was very dry, but we raised good crops, and were it not for failure elsewhere corn would not be worth more than twenty-five cents per bushel here—as it is, fifty cents is the highest price.

We are greatly in need of saw, flouring, and woolen mills. There are a few of the first, two flouring mills, and one woolen mill in the county, but they only show the necessity of several more of each; no investment could pay better. Mechanics of all kinds are wanted; laborers have been receiving from $1 to $1 25 per day during the present year, and farm hands about ——— per month and boarded.

Our leading crops are corn, wheat, oats, timothy, and millet; farmers are becoming convinced that there is more profit in timothy than in any other crop, as this is a stock country. We have not been very successful in raising wheat until recently; but now, with new plans of cultivation and better varieties of seed, both adopted after a considerable amount of experimenting, it is thought that no trouble will be had hereafter in raising good crops. Rye does remarkably well, but is not so much raised as it should be. Oats, timothy, and millet also do well.

Parties from Wisconsin contemplate engaging in hop raising, being satisfied that hops will do as well here as in Sauk county, Wisconsin, climate and soil being fully as favorable.

A large amount of Osage orange hedging has been and is being put out, and it is thought to be all that is desired; there are hedges that have been turned out for some years proving to be satisfactory.

The county agricultural association held its second annual exhibition last October, and it was a decided success. The society has grounds inclosed, sheds raised, etc., and are fairly organized and started on the march of improvement. If it will keep its original objects in view and not degenerate into an annual horse race, as many such societies do, much may be hoped from it.

All the fruits that flourish in this latitude do well here, except peaches, which generally winter kill; apples succeed as well as could be desired, and this being as far north in the Missouri valley as they can be profitably raised, we can always count on a good market in Western Iowa and Nebraska; wild plums grow luxuriantly, and we may expect cultivated ones to do as well, especially the Lombard, though it would be difficult to find any of the cultivated kinds to surpass some of the wild ones in flavor or size. The few experiments that have been made with pears have been a success. The early Richmond cherry can be depended upon here as elsewhere in the west. Grapes have not been tried to any considerable extent; the Isabella, Hartford, Concord, and Delaware all fruited with me this year for the first; also the Taylor bullet, which I will graft in the spring with something of value. The small fruits have not been tried much, except strawberries, which bear well with but little care. I shall fruit all the leading varieties next year. I had a few American seedling gooseberries in bearing this year, and found them up to the mark. Currants need a little shade, and are much troubled with the worm—expect to fruit the leading new varieties next year, also the Kittatinny blackberry. I have Doolittle's black cap from N. J. Colman, of St. Louis, also the black cap from the woods; I give the latter preference.

Our farmers are generally engaged in stock raising, our prairies affording pasture and hay for many times the cattle that now roam them. From April till November the only cost of keeping a herd of stock is about twenty-five cents per head a month for a herder, and if the owner has blue grass pasture he can keep his stock much of the remaining five months upon them. Our farmers do a very profitable business in raising stock—principally cattle. Some mules are raised, and upon nearly every farm some sheep. Of late that interest has been attracting a considerable attention, and we have some fine stock; but present prices of wool are a drawback.

Perhaps there is no finer opening in the world for dairymen to grow rich in than here; with a market at St. Joseph and the West that will more than average New York city prices for butter and cheese; with pasturage free seven months in the year, and best timothy hay to be had at five or six dollars per ton, or prairie hay for the cutting, and corn at an average of forty cents per bushel, and cows at from $25 to $40 apiece, what better chance could be desired? As good butter and cheese can be made here as anywhere else in the world. There is nothing in the country or climate to prevent. There is also a great deal of money in hogs on the average, and especially so this year, and our farmers are getting it. Our timbered bottoms afford fine range for grunters until fattening time, when, with corn at from 20 to 40 cents per bushel, they are soon fit for market.

This has been a very fruitful year with us in everything. Corn was cut a little short by drouth, but not so badly as was at first supposed; hay, oats, wheat, and the fruits were large crops, and, come what may, we have abundance to begin the new year with.

I have endeavored, as briefly as possible, in the foregoing, to give a sketch of our county for your report. It might have been made much longer, but your report would be too crowded if the articles were lengthy.

I have not given many figures as to crops, as they are difficult to arrive at correctly, and from the nature of your work they do not seem to be aimed at. The estimates of the Commissioner of Agriculture at Washington are probably as reliable as anything that can be had on the subject.

HOLT COUNTY—Clark Irvine.

Holt county, lying in the extreme northwest of Missouri, originally a part of the Platte purchase, is bounded on the northwest, on the west, and on the south by the Missouri river, on the north by Atchison county, and on the east by the Nodaway river. It is of irregular shape. Its greatest length is about thirty-eight miles; its width, between the Missouri and Nodaway rivers, is from three to twenty-four miles. So much of its territory being bounded by rivers, it therefore has a vast amount of what is called "bottom land." The width of the Missouri river bottom varies from a few rods to about nine miles. It is mostly covered with timber of different kinds, though cottonwood is most abundant. There is some prairie land in the bottom of a very desirable kind for farming purposes. The soil is very rich and of great depth. It produces corn and other crops requiring a rich soil in great abundance. The objection to living in the bottom is the frequent prevalence of malarious diseases, and it is doubtful if there will ever be a time when these diseases will prevail there to a less extent, as the cause is constantly reproduced by overflowing waters and decaying vegetation.

Adjoining these bottoms are the bluff lands, which are very rough and even mountainous, often covered by a dense growth of oak trees, and hazel, sumach and alder bushes. The soil of these lands is more of a clay-like nature. Little use has been made of these lands as yet; but grapes and other fruits have been grown quite successfully on them, and the time is coming when they will be valuable.

I come now to speak of the upland prairies of this county. These prairies are the pride and glory of our people, and indeed with just cause. The traveler northward along the Missouri river, just as he crosses the Nodaway river, finds a peculiar kind of soil, very different from any which he has ever met with elsewhere south and east of that river. The Nodaway river is the eastern and southern boundary of a region which possesses this soil, and which extends as far north as Sioux City and the northern boundary of Nebraska, and from thirty to one hundred miles on either side of the Missouri river. This soil is a kind of loam, very mellow, friable, very rich, and of great depth. For countless ages the rank grasses have grown, decayed or burned up year after year on these plains. Dig down thirty, forty, sixty feet, still no "hard pan," no joint clay or gravel—nothing but rich earth, capable of producing one hundred bushels of corn to the acre. Interspersed over the surface is a pleasing and useful variety of groves of timber and streams of living water. Taking your stand on some one of the highest ridges north and east of this town, on a bright June day, it is no common sight that greets your eye. The view seems boundless. Looking north or west, until the power of distinguishing is lost away in the far-off regions of Iowa, Nebraska, and Kansas, the same lovely scene of prairies, groves, ravines—the mighty Missouri, winding and turning everywhere, with ten thousand minor streams sparkling on their way toward her bosom, is unfolded before you, and you are tempted to exclaim, as did an old Pennsylvania farmer on first seeing this country under like circumstances, "Here is an ocean of glory!"

Now there are some facts in respect to this region to which I wish to call attention. We old settlers have always talked it over among ourselves, but I have never seen it in the public prints. First: all of the country bordering on the Missouri river, and for hundreds of miles on each side of it, is subject to great drouths, and in some parts great suffering is sometimes caused thereby. But drouth does not seem to injure the crops of the region I am speaking of to anything like the extent it does where there is a different soil. For instance, I am told that in some counties south of this there is at present great destitution on account of dry weather, particularly in Callaway county. I am satisfied that they have had as much rain as we have had in seasons when we have made tolerable crops. If we have one good rain in the spring, enough to wet the ground well, we will make very good crops if we get no more than one light rain, in seasonable time, afterward, because every drop that falls soaks in the ground, and seems to be drawn to the roots as it is needed. Although we have been blessed this year with more rain than is usual for this region, yet there have been periods of such drouth as would have been fatal in some parts of the country. That small quantity of rain which enables us to make splendid crops, in Ohio and Indiana would cause universal destitution. Our assessor's report for this year shows that out of twenty-two thousand acres planted in corn were produced eight hundred thousand bushels. As the grasshoppers destroyed vast fields of early corn, much was planted too late to mature; hence the yield is comparatively small. The fact is, the soil is exactly adapted to the climate. Another fact, which people will not believe until they see it, is this: let it rain a week, pouring steadily down, and clear off at the end of the week of rain, the next day our farmers will be plowing, because the longer it rains the deeper it soaks. A few hours after the heaviest rains the roads are dry, even dusty. Another fact is that we are almost exempt from killing frosts in the spring and fall; frosts do come, but owing to the extreme aridity of the atmosphere they are harmless. It is not uncommon to see the bloom on peach trees covered with a white frost which is perfectly harmless. When I first *saw* this I could not believe it until, in the ensuing fall, I saw the very same trees burdened with peaches whose bloom, in the spring, I had seen covered with hoar frost. Generally, when the temperature is in condition to produce frost here, everything is dry enough to crack to pieces. Observing these facts, our early settlers predicted that this climate and soil would be favorable, to a very remarkable extent, to fruit and also to wool growing.

The fruit which seems to do best here, where all those of the temperate regions do well, is the pear. Observing the instructions of the men most experienced in growing the pear in the Eastern States, and the theories derived by them from long use, I find all the conditions realized here in the natural condition of the soil after it is once turned up. Of course no drainage is necessary here, while the phosphates, the limes, etc., required in manuring are found in this soil, abundant as needed and to wonderful depth. Twelve years' experiment here establishes the fact that the pear trees, whether dwarf or standard, thrive better, bear more abundantly and richly than in any other part of the continent yet heard of. No disease has as yet attacked the trees, and in most cases little or no attention has been paid to them. With one-fourth the care bestowed on them in the East, the planter is richly rewarded. Apples do as well as in any country known, and, under our remarkable exemption from injurious frosts, are almost a certain crop. Thirty miles north of us it becomes more difficult to produce the apple and pear; sixty miles north it is generally abandoned as unprofitable, and in the latitude of Council Bluffs and Omaha it is deemed impossible, after twenty-five years of experiment. If now we consider the fact that north and northwest of us is a vast region, over which

"The first low wash of waves
Of nations yet to be"

is beating, capable of and soon to sustain countless hoards of people, and where these delicious and necessary fruits cannot be produced, we shall see why, in the eternal fitness of things, and nature being ever true to her own processes, a certain section of country along the line of 40° north latitude is so peculiarly adapted to fruit growing. Even now, every October and November, thousands of wagons visit our farm orchards and, paying high prices, load with apples, pears, etc., and depart to the regions of the Northwest. Five acres planted in pear and apple trees are a certain competency and a probable fortune to the owner, in Holt county.

Next I would say a few words on the fitness of our situation and climate for sheep grazing. I have always heard, and I believe that nearly if not all the diseases of sheep are caused by damp soils, damp air, and unwholesome food. Such being the case, a dry climate and soil like this, with millions of acres of free range covered with abundance of most wholesome, nutritious grass, would be favorable to wool growing in every aspect of the subject. I am told on all sides, by men of experience in the business here, that the sheep is positively exempt from disease in these prairies. Such is the universal expression among sheep graziers from Sioux City down to this point. Certainly, if wool growing is a profitable business in the Eastern States, where pasturage is costly and disease is common among the sheep, it must be more profitable here, where there is exemption from disease, and the best pasturage in the world, without money and without price, is and will be, for many years, on all sides around us. For at least seven months the pastures are good, while the winters are cold, but very dry. During the five months of feeding it is a rare thing for a drop of rain to fall; sometimes a little snow falls, but none compared with what falls in Ohio and Indiana.

The most unpleasant feature of our climate is the wind, which blows alternately from the southwest and the northwest—"blows great guns"—and fills the air with dust, rendering existence outdoors almost intolerable. Were it not for these winds I would have no hesitation in saying that our climate is the most agreeable of any part of the Union. Still windy weather is not unhealthy—just the contrary—and we console ourselves with the reflection that the wind does not blow over one-third of the time. There certainly never was a new county that had less disease prevailing than this has. Especially are we exempt from pulmonary diseases; it is doubtful if a true case of pulmonary consumption ever originated here, while there are many instances of supposed cases, among persons from the East, very far gone, where cures have been effected by an out-door, active life on these plains. Let physicians send their consumptive patients, in common covered wagons, across these plains of the Northwest a few times, instead of to Cuba, and the increased per cent. of cures will astonish them.

I would write of other matters, but I have already consumed too much space. I will conclude by summing up.

We have abundance of timber and water, which are conveniently distributed; are almost surrounded by navigable rivers; have less frost, less rain, more wind, the richest soil, thousands of acres of new land—the best adapted to sheep grazing and fruit growing—land cheap and land dear, one of the very healthiest of climates; and, we believe, better inducements to intelligent, industrious farmers to locate among us than any part of the West. We have good schools; churches, built and building; lawyers, preachers, doctors, and teachers enough and to spare. We have a railroad nearly completed through the whole length of our county; cars will be running early next summer, thus connecting us with all the railroad points on the great routes.

Come and see us. We need a few men of moderate capital, with the real "Yankee get up" about them, and as many industrious agriculturists as can get here. There certainly is no part of the world where the investment of a few thousand dollars promises a larger return to the owner than does this.

JACKSON COUNTY—Jesse P. Alexander.

Independence, Mo., December 4, 1867.

L. D. Morse, *Corresponding Secretary:*

Jackson county is the most western county in the State on the south side of the Missouri river, and bordering thereon. Ever since the settlement of this county it has been noted for the richness of its soil, excellences of its timber, limestone, water, and health.

This county, with the exception of the cities of Independence, Kansas, and Westport, was entirely depopulated for one or two years of the war. The inhabitants, as well as all domestic animals, were removed to the cities or out of the county. Farming operations were entirely suspended for two years. A spontaneous growth of luxuriant vegetation sprang up on the farms and on our broad and rich prairies, destined, in its turn, to be consumed every fall by the devouring flames with which the whole face of the country was devastated. A large majority of the houses, barns, fences, and other improvements were destroyed by this raging element. There was not an inhabitant to stay its fury. Deserters from both armies, and persons fleeing from conscription in the South and from a draft in the North, found in this depopulated district that seclusion they so much desired. A petty warfare was kept up by these factions, called on one side "bushwhackers," and on the other "jayhawkers." What property the fire left was carried off and destroyed by these roving bands; and long after the military restrictions by which this county was depopulated were removed, and the inhabitants allowed to return to their homes, these guerrilla bands were a terror to many.

These are some of the reasons why our county is not able to make a better agricultural appearance. These difficulties are now happily removed, and peace, order, and prosperity once more restored. Many of the farms are yet untenanted, the houses unbuilt, and the fields unfenced. Tens of thousands of acres of the best land in the county are offered for sale by the former occupants, who never returned to them.

The settlement of this county after peace was made was as the peopling of a new and uninhabited country. This has gone on uninterruptedly and with unprecedented rapidity for some three years. Once noted for the wealth and refinement of its citizens, the county is fast regaining its former character. Residences and farm houses are springing up everywhere, and this county will soon be noted for that wealth and refinement that once so justly characterized its citizens.

No county is better watered than Jackson. The Missouri river washes its entire northern boundary for fifty miles, with the Kansas river on a portion of its western border. The Big Blue, the Little Blue, and the Sni run through the county. No lands could be better watered. All the lands in the county, excepting a few farms on these river bottoms, lie in broad ridges, gently descending to the hollows, in which we always find bold springs of inexhaustible water coursing their way to one of these rivers. We find limestone in every hillside, a few feet below the surface; enough in all to turnpike every public road in the county and fence every farm into five-acre lots. Although so abundant as a fencing material, yet the plowman, in his delving course, seldom strikes a stone with his plow.

Farmers will readily comprehend the character of our soil when I tell them the growth of timber in this county is elm, hackberry, linn or basswood, white and black walnut, white and black oak, chestnut oak, red oak, mulberry, wild cherry, red bud, pawpaw, honey locust, and hickory.

The crops are such as are usually raised on this kind of land—corn averaging some forty bushels; wheat, twenty bushels; rye, twenty bushels; oats, fifty bushels per acre. We also raise quite exsensively potatoes, all kinds of garden vegetables, apples, grapes, and all fruits usually raised in this climate; besides buckwheat, barley, hemp, and tobacco. Much attention is paid to raising horses, cattle, hogs, sheep, poultry, etc.

Besides the usual number of flourishing villages in Jackson county, there are two large and growing cities. The city of Independence is the county seat, and is admitted by all who have ever seen it to be one of the prettiest towns in the State. It has the usual number of flourishing schools (one of which has five hundred pupils), churches, mills, manufactories, banks, and an agricultural and mechanical society.

But the city that will cause the agricultural resources of Jackson county to be most rapidly developed, and the whole county, at no distant day to be converted into gardens, orchards, and vineyards, is Kansas City. This city is situated in the extreme northwest corner of the county, with its city limits adjoining the State of Kansas. It contains fifteen thousand inhabitants. It has doubled its wealth and population in the last year, and bids fair, with its present strides, to double again in the next year or eighteen months. The city only started a few years ago on the bold bluffs of the Missouri river, and is now making rapid advancement in wealth and business. Its geographical position at an elbow of the Missouri river, and its railroads radiating out to all points of the compass, give it an advantage its inhabitants have not been slow to seize upon. With the Pacific road completed to St. Louis on the south side of the river; the North Missouri road nearly completed on the north, giving a connection with St. Louis and all eastern roads; the Kansas City and Cameron road, now completed, giving a connection with Chicago and all northern roads; the Missouri River road, nearly completed to St. Joseph; the Kansas City and Leavenworth road, in operation; the Union Pacific, completed far into the plains, and destined, in a few years, to kiss the waters of the Pacific at the Golden Gate of San Francisco; the Lake Superior and Galveston road in rapid course of construction—every one can see that Kansas City is destined, at no distant day, to become one of the largest commercial and manufacturing cities in the Union.

It is contemplated by an association of railroad interests to have a uniform gauge of road from Boston and New York city across the continent to San Francisco; tunneling every mountain and bridging every river. This line crosses the Missouri river at Kansas City on a railroad bridge which is now being built as fast as men and money can accomplish the work. By this line, when completed, passengers can step into a car in Boston or New York and step out of the same car in San Francisco. Cars loaded on the shores of one ocean will be run across the continent and unloaded on the shores of the other. This is to be a national line, spanning the continent from east to west; and freight and passengers will run across the whole distance without change of car or gauge. Another national road is to span the continent from north to south—from Lake Superior to Galveston, in Texas. This line will cross the Missouri river on the same bridge.

Capitalists and emigrants see the importance of this county, and are coming in by hundreds. Lands that were low at the termination of the war are advancing rapidly in value. All the houses are full and others are springing up as by magic.

The labor on the farm is white. The freedmen have nearly all gone to the cities and towns. As a class they seem but little inclined to engage in permanent agricultural occupations.

JACKSON COUNTY.—Chas. Long.

This county is one of the best, agriculturally considered, in the State. It is about thirty-five years since the first settlements were made. In 1860 the population numbered over 22,000, but during the war this was greatly decreased, and it is probable that at its close there were not more than 10,000 inhabitants in the whole county. Since then, however, the population has rapidly increased by immigration, principally from the Northern and Eastern States, until at present it will probably exceed 30,000.

The surface of the county near the Missouri river is much broken, although even the bluffs are very fertile; but within four miles the prairies begin, and the land is generally pronounced the finest in the State, being equally adapted for grain, grazing, fruit growing, or stock raising. It is well wooded and watered, being intersected by the Big Blue, Little Blue, Rock creek, Turkey creek, Sniabar creek, Indian creek, and several other smaller streams, and bordering for nearly thirty miles upon the Missouri river. These streams are all fed by springs which are very numerous in the county, and consequently are permanent. The water is generally hard.

There is little valuable water power in the county, steam power being employed almost exclusively for manufacturing purposes.

The timber most abundant on the uplands is oak, with some hickory, basswood, hackberry, and elm. In the bottom lands, walnut, cottonwood, and sycamore are the principal varieties. The kinds of timber are very various, being five or six varieties of oak, several of hickory, several of elm, walnut, mulberry, hackberry, ash, locust, coffee bean, basswood, and wild cherry. The wild fruits are crab apples, mulberries, persimmons, haws, grapes, pawpaws, plums, cherries, blackberries, dewberries, raspberries, strawberries, gooseberries.

The government lands, if any, in this county, are worthless crags and bluffs along some of the streams. Most of the lands are owned by actual residents. The only corporation owning land here is the West Kansas City Land Company, which owns a large body of land adjoining Kansas City, on the west and south, and which they are selling in town lots and small tracts to parties desiring to improve. The average price of improved farms is twenty-five to thirty dollars per acre; of unimproved lands, seven to ten dollars per acre.

The principal rock is limestone, blue and gray. The former is being used in the construction of the piers of the Missouri river bridge at Kansas City, and is pronounced by the engineers most excellent in quality.

Coal is believed to exist in paying quantities, but has not been developed to any considerable extent. The indications of coal oil at Mr. Mills' landing and other points in that vicinity are quite favorable, but no steps have been taken to demonstrate its presence.

There are about ten to fifteen flouring mills in the county, a large number of saw mills, three or four foundries, one woolen factory, besides many other factories for the conversion of our raw material into merchantable shapes.

All of the newer styles of agricultural implements are in use, and the latest improvements are adopted as fast as they are introduced. No manufactory of agricultural implements has been established in the county except one for the making of plows and wagons, at Westport, by M. T. Graham and assistants. No better market for the sale of such implements than Kansas City can be found in the whole West, nor a region better supplied with all the essentials for carrying on the business successfully and cheaply, which renders it surprising that no one has entered into it at that place. Doubtless this want will be supplied before another year rolls around.

There is a county agricultural society, whose headquarters are at Independence, and a horticultural society at Kansas City. Both were suspended during the war. The agricultural society has been revived and had a very successful fair this year, at which there was a splendid show of fine stock of all kinds, as well as grain, fruits, textile fabrics, etc. The horticultural society is still dormant, but begins to show some signs of waking up.

The proportion of the county in cultivation is not far from two-thirds, and this is being rapidly increased; and at the same time the manner of cultivation is vastly improved since the days of scarce labor.

The principal productions are corn, wheat, rye, oats, barley, with some hemp and tobacco. Stock raising has always been, and is now a great source of profit to the farmer of this county. Horses, mules, and oxen were formerly their main reliance, but latterly much attention is given to sheep raising. Large flocks of very fine-wooled sheep are continually driven to this county from the Northern and Eastern States, thus creating a demand for woolen factories at once.

No very large number of hogs are slaughtered at home, owing to the great facilities for transportation by the various railroads traversing the county to St. Louis, Chicago, and other eastern markets.

The crops of wheat, corn, hay, etc., are excellent this year, and always average high but I cannot give details with any degree of exactness. The census returns for 1860 show what was done before the war, and the present amounts raised will not differ materially.

I have never seen fruit of finer quality or more abundant in quantity raised anywhere than in Jackson county, and much improvement is being made constantly, in both respects, all over it. Our principal market for fruit, and in fact for most of our surplus produce, is west of us in Kansas and Colorado, where the demand is unlimited and the home supply scanty.

No very extensive vineyards have been planted in the county so far; although Messrs. Vogel & Horning, of Westport, are increasing their vineyards steadily, making excellent wine of Catawba, Concord, and Virginia seedling. Many smaller vinedressers have planted the sunny slopes about Kansas City, Westport, and Independence with the favorite species, but too recently to warrant much notice.

In conclusion, it must be borne in mind that Jackson county has been the seat of a constant bitter and destructive guerrilla warfare, from the spring of 1861 to the spring of 1866, and what she has done in the way of improvement has all been done within the past year or year and a half, and in spite of the great drawbacks due to the growing out of great civil discord. Her shortcomings in the way of manufactures, etc., are also attributable to the same causes; but it is cheering to say that such causes do not now exist.

Peace and harmony rule in every part of the county, and their legitimate fruits are visible in the growth of her cities, the rapid progress of her railroads (of which four have been finished and put into operation since the close of the war), the astonishing influx of population, and the magnitude of her business in every direction.

Wheat.—This cereal is not raised yet to a desirable extent in our county. The crop seldom fails and the yield is generally very good. We have attentive farmers who reached a yield this year as high as fifty bushels to the acre in the richest regions, others on inferior soil not over twenty-two bushels. The average crop may be safely estimated at twenty-eight bushels to an acre. The grasshoppers had destroyed considerable of our fields, and the losses in consequence are not brought into account in my estimate of the average yield. Winter wheat is almost exclusively sown, only this year a good deal of spring wheat had to replace the fall seed where the grasshoppers had devastated the latter. The largest and heaviest crop was mostly obtained by subsoil plowing and good preparation of the soil. The subsoil plow I may say was only experimentally tested, but wherever it was tried the crop did tell. The good result derived from the experiment of this mode of cultivation should be recommended. It is difficult to arrive at an exact aggregate of wheat grown this year. From the best information we may say that about 80,000 bushels of wheat were raised, not quite or scarcely enough for home consumption. A good deal of this sort of grain had to be brought from abroad to supply our mills, and flour was also shipped to a great extent from other points to our young commercial metropolis, Kansas City, for her trade.

Corn seems to be the favorite produce with our farmers; yet I may safely say the crop never fails, and the richness of our soil seems to warrant a good crop every year. In our bottom lands the average yield was seventy bushels to the acre, while on high, more dry and hilly land the average could only come up to the figure of forty bushels. Two varieties of corn are planted in the county, the most preferred being the white grain, because it is more salable in markets and purchased for every use; while the yellow corn is exclusively used for feeding stock, the latter kind being preferred for that purpose, the opinion prevailing that it had more strength. The manner of feeding is principally in ears. The farmer, after having his corn in his cribs, will husk and throw it out to his hogs, cattle, mules, etc., in the yard, by which method great losses occur—it being tramped into the mud and ground. Great saving could be attained by adopting another mode of feeding. This produce is brought to market in ears. Whenever the time has come that our crop will overreach home consumption, then and not sooner will farmers shell their corn and bring it to market in shipping order. The aggregate amount raised in Jackson county this year will fully come up to 250,000 bushels.

Rye is only little planted here, although there is always some demand for the cereal. Rye flour is used by all our city bakeries and in many German families. Farmers would do well to give some attention to this kind of grain.

Buckwheat and barley.—Of the latter quite a quantity is used in the breweries of our cities. Kansas City sends every year large amounts of money to St. Louis and other places to procure barley and malt for four extensive brewery establishments. Farmers in this county would find themselves well remunerated, pecuniarily, by paying their attention to barley, not only as an article for beverage, but also for animal food. The few farmers who planted the grain were well satisfied with the yield, our soil being excellent for the same. To buckwheat little attention is paid and it is only raised for home use, very little of it being brought into market.

Potatoes.—The crop this year is quite a large one compared with last year, when we had to bring from St. Louis this article in large quantities. The high prices commanded for a long time have induced our farmers to plant this most desirable vegetable more extensively, so that our supply for home use is not only guaranteed, but we will most probably have a small surplus for our neighboring State. It is very difficult to arrive at even an approximation of the number of bushels raised in the county. As for the average per acre, I may state that well-cultivated fields did yield from 250 to 300 bushels, while others not well attended only yielded about 120 bushels.

Hemp, once extensively cultivated in our county, has been neglected. It used to be a favorite article among our large farmers who had the help of slave labor; but since free labor is only attainable, and as this was always high and scarce, hemp was raised but to a small extent in the eastern part of the county. We have soil in our county which is exceedingly well adapted for the raising of hemp, and it used to be remunerative. Another reason for the neglect of this produce may be found in the high prices of grain in the latter years, which paid exceedingly well without needing as much work. The same may be stated in regard to tobacco, which has been planted this year more for home use. Only a few farmers planted for market. The manufacturers at Kansas City cannot get their supply from this county. The small quantity they could find for sale all over the county did not amount to 10,000 pounds, although a good portion of the soil is excellent for this article, and the quality raised comes up to the fairest in the State. Farmers who planted the weed state that the soil is not more impoverished from it than from other crops.

JASPER COUNTY.—E. M. BURCH.

DR. L. D. MORSE—*Sir:* Your circular requesting information in regard to questions therein propounded is received, and were it in my power to give full and satisfactory answers to them, I should certainly answer them with pleasure, but I am deprived of that time and opportunity required to give that extended reply and that exactness of statistics the subject deserves.

I would remark, then, in reply to your questions: Jasper county is one of the southwestern counties of the State, being also a border county. It is separated from the State of Arkansas on the south by the counties of Newton and McDonald.

About one-third of the land of the county is timber, the other two-thirds being prairie, beautiful in appearance, and susceptible of the highest state of cultivation, and can be made to teem with luxurious crops when the season favors. And no county in the State presents better facilities to the industrious farmer to become independent of want. The varieties of timber are as follows, to wit: Black walnut, white walnut, pecan, shell-bark, white and black hickory, white, black, post, burr, Spanish, chincapin, yellow, pigeon, and blackjack oak, white and blue ash, box elder, hackberry, sycamore, buckeye, red and bitter elm, birch, sugar and white maple, wild cherry, mulberry, black and honey locust. Shrubs: Paropan, persimmon, redbud, whahoo, plum, buckthorn, dogwood, black and red haws, ninebar, crab apple, sassafras, hazel, prickly ash, wax apple, and spicewood.

Vines: Trumpet creeper, Virginia creeper, bitter sweet, and hops grow wild in abundance. Grapes: Summer grapes are to be found on every hillside, and on all our streams in the county they grow luxuriantly, and are used principally for wine.

Lands.—Raw land varies in price from three to six dollars per acre; improved farming land varies from seven to twenty-five dollars per acre.

Fruits.—Fall apples: White pippin, rambo, fall pippin, national stripe, Smith's sweet cider, maiden's blush, golden pippin, Pennsylvania red streak, and yellow bellefleur. Winter apples: Union red, jenitan, white winter pearmain, winesap, limbertwig, large and small romanite, etc. Peaches: Many trees of the finer varieties have been planted, and have done well, but the larger portions of our orchards are seedlings, yet of very good qualities, and usually we have very abundant crops. Quinces grow well, and produce finely, but we have but few trees. The small fruits, strawberry, raspberry, blackberry, gooseberry, cherries, and plums grow spontaneously.

Our principal productions are wheat, corn, oats, potatoes, barley, rye, and buckwheat. The average yield of corn per acre is about forty bushels; average yield of wheat, twenty-five bushels per acre; oats, forty bushels per acre; potatoes, Irish, about one hundred and fifty bushels per acre; barley, rye, and buckwheat average about twenty bushels per acre. Sweet potatoes are only cultivated for home use, although we have a fine sweet potato climate. Sorghum is cultivated by nearly every farmer for his own use, and grows much larger here than in a more northern climate.

Cotton is cultivated by nearly every farmer for his own use. Tobacco is grown to some extent for market; average yield from eight to twelve hundred pounds per acre.

There are at present about six thousand fine-wooled sheep in the county. Prairie and tame grasses are coming into favor with every good farmer; our principal hay crop is taken from the prairies. Hedges have been tried to some extent before the war, and proved very serviceable, being very luxurious in their growth. There have been several kinds of hogs of different breeds introduced into this county, of which the Chester white is preferred, and they seem to do better than any other varieties. Cattle, horses, and mules we have, but a very few of the improved breeds; although I can say it is one of the best stock counties in the State, owing to the mildness of its climate, its abundance of grass and water, the county being well supplied with springs. Our streams of water are north fork of Spring river, Coon creek, Dry Fork, Spring river, Center creek, Jones creek, Jenkins creek, and Turkey creek, which afford water during the year. Spring river and Center creek are considered as good mill streams as there are in the State. A number of the mill sites of the former stream are occupied, still leaving water-power privileges for manufacturing purposes in the county.

Minerals.—Lead has been discovered in different portions of the county, the most noted mines being the Turkey creek and Center creek mines. Lead has also been discovered within two miles of Carthage, our county seat. As yet there has been no coal discovered in the county, our market being supplied from Barton county—price per bushel varying from twelve to fifteen cents. The county abounds in flint, gray limestone, and sandstone of a superior quality for building purposes.

Taking Jasper county as a whole, her mild climate, fertile soil, rich minerals, her forests of oak and black walnut, with her great facilities for water-power, together with her present cheap lands and loyal population, I would say that she offers as great inducements to the industrious man seeking a home as any county in the State, and to all such we would say, Come and see for yourselves.

JEFFERSON COUNTY.—W. S. JEWELL.

DR. L. D. MORSE—*Sir:* It being the request of the State Board (and a clause in the constitution of our county society makes it the duty of the secretary) to furnish a report of our transactions for the closing year, I send you a brief statement of what has transpired since my last report. The year has come and nearly gone, as many have before it, with nothing very strange or startling to note though we have had rather an unusual season for farm operations, it being unfavorable for a portion of our crops—though taken on the whole, we have enough to keep want from our doors and some to spare.

The fore part of the season was cold and backward, being at least two weeks later than usual; the spring months having a great abundance of rain—it was heavy and almost continuous—making it impossible for farmers to get their crops planted in good time, especially those of flat, wet or heavy lands. Those having rolling or sandy lands did better. As a consequence of so much wet weather the weeds got a good start, and farmers a little short of help or teams found they had undertaken more than they could get through with successfully. Many were compelled to drop a part to work the balance.

The spring and early summer crops were good, especially meadows, they turning out extra coats of grass. The wheat crop was hardly an average, on account of the lack of snow the last winter, it freezing out a good deal, but the loss in quantity was made up in quality—the grain being heavy and plump. Oats reasonably fair. Corn crops were cut short by the drouth, they averaging not more than half the usual amount. We have not had rain enough to wet the ground since the last of June, except in a few places. The showers were few and far between. Irish potatoes, a poor crop; sweet potatoes very good; and while speaking of them will say that those grown in small hills were much the best, owing to large hills baking more than small ones. Turnips did not do much.

The sorgum fever is dying out considerably, there being but little planted. I suppose the reason is on account of the poor quality of the sirup heretofore made; though a few that have good mills and evaporators continue it, and think it remunerative. Many believe it hard on land, no other crop succeeding after it. Buckwheat, castor beans, hops, flax, or cotton, none raised. Tobacco is raised to a small extent, and does well. Hops will grow in many places, and I cannot see why they would not pay well.

The fruit question was thought to be run into the ground a year ago, but what was done then, and the results since, have only given it a mighty impulse. At all gatherings and meetings of neighbors and friends almost the first words of salutation are, "How are your trees or vines looking?" "How many are you going to plant out?" "Where can I get them?" etc. Many are planting out on an extensive scale, while nearly every person owning land is planting a few for family use, or adding to their older vineyards; while a considerable number of new comers are renting lands for a term of years and planting on the shares, the owner of land generally furnishing trees and vines, getting half the crop for eight years, the renter doing the planting, cultivation, and gathering. I hardly know whether the latter mode of doing business will succeed or not, as it is apt to be done in a careless way, looking more to present than to future crops, which is not considered the best way of succeeding in grape growing; on the other hand there will be many vines planted out and some grapes grown that otherwise would not be, thus preparing the ground and giving a stimulus to improve those already planted.

Fruit has done well the past season, especially peaches and grapes; this county having some of the best specimens at the vinegrowers' meeting, and taking the first premium at the St. Louis fair. We also had the first peaches in the St. Louis market (except one lot, new variety), beating the Southern Illinoisians. There are but few orchards and vineyards that have age sufficient to make an estimate of profits.

The Jefferson county horticultural society holds its monthly meetings regularly at Victoria, and they are quite interesting; the attendance is generally good, I might say large, considering our sparse populated country; and there is scarcely a meeting held but what more or less of the specimens on exhibition are sent away to the north and east, by strangers present, they thinking them something superior to any they have ever seen of same varieties.

There has been a farmers' club organized at Hillsboro, which is very well attended, and the discussions are interesting; but whether it will continue its usefulness is a question that time will prove. I believe it was gotten up principally by the legal fraternity and others of our county seat, and whether they are enough interested in the cause to keep it going, remains to be seen.

We have an agricultural journal just starting at DeSoto. It is called the *Horticulturist and Farmer*, and will be principally devoted to the horticultural interests of Southeast Missouri. It is published by our old friend O. A. A. Gardiner, late of Mexico, Adrian Co., Mo.

Our agricultural society held its first annual fair at DeSoto, September 25, 26, and 27, and was a decided success, being ahead of all expectations of those interested in its management. The people of the county turned out well, and we had large delegations and accessions from St. Louis, Washington, St. Francis, and Iron counties, as also many from Ste. Genevieve, Madison, and Franklin counties. The amount of stock on exhibition was very creditable, especially horses. Cattle, hogs, and sheep might have been better in number. Of sheep there were several very fine long-wools on hand, belonging to J. T. Davis, and G. G. Robinson, of this county. In chickens we had quity a display of the improved breeds. The ladies' department was well gotton up, the large hall being filled to its utmost capacity in the way of textile fabrics, fine arts, household implements, as also several lots of native minerals, among which were some monster specimens of lead ore from the Platina Lead Company's mines, in the southeastern part of the county; also several specimens of kaolin from Washington county, presented by Mr. J. T. Robinson. But the great attraction of the fair and our county may justly feel proud, was the fruit hall, containing such specimens of fruit as are but seldom seen. The number and amount of varieties was not as large as it might have been, but the beauty and quality of the specimens present made up for quantity. There might have been a better display had there been any regular system among the exhibitors. Many coming brought a few samples in their pockets or handkerchiefs, some in baskets, but few realizing the fact that quantity enhanced the display.

Being the first fair ever held in the county, and a new business to all concerned, there were many omissions and mistakes made, but they were generally overlooked, and all were highly elated.

Real estate is still looking up in price, though not as fast as it would were it not for the financial troubles existing at present. Money is scarce and hard to come at. There are many transfers, and generally at remunerative prices. Sales are mostly near the line of the railroad, and small tracts, especially those suitable for market gardening purposes; larger ones having been divided up. In some instances land that was sold twelve months since for $ 0 per acre is now bringing $80. Our nearness and facilities for getting to market, as also the adaptability of our lands for fruit growing, are still causing immigration to our county; the most suitable locations being fast taken up and improved.

There might be several other branches of husbandry made profitable in this county, among them the dairy business—cheese, butter, and especially milk for city use. Many places immediately on the line of our railroad are well adapted to grass growing for pasturage, and the distance from the city not being half as great as many places in the East, where it is carried on with profit, and land is only one-third the price, and milk higher with an almost unlimited demand.

Time and circumstances compel me to make this report limited; but I hope the time is not far distant when Jefferson county will take the rank she deserves.

LAWRENCE COUNTY.

The following is the report of the board of directors of the agricultural and horticultural society of Lawrence county:

MOUNT VERNON, *October* 6, 1867.

We, the board of directors, hereby report the state and condition of this society:

1. A petition for the organization of this society was circulated and signed by fifty freeholders of this county, prior to the 22d of May, 1867.
2. The first meeting of said petitioners was held at the courthouse, Mt. Vernon, on May 22, 1867. Twenty of said petitioners being present, they proceeded to elect, from their number, nine directors to superintend the business of the society.
3. The first meeting of the directors was held June 22, 1867, at which they elected their officers for the first year, and appointed committees to ascertain concerning fair grounds, and to draft a constitution and by-laws for the society.
4. The second meeting of the directors was held July 20, 1867, to receive the reports of the committees, and to adopt a constitution and by-laws. A record book was ordered to be kept open at the office of the secretary for the reception of members to the society.
5. The membership, October 6, 1867, is 107, and the membership fees

for 1867 is $2 50, except the nine directors, and the secretary and treasurer, who are admitted free. Aggregate membership fees, $240 00.

6. At the third meeting of the directors, September 6, committees on programme and premium list for the first fair were appointed, and their respective reports were received, which fixed the time of holding the county fair on October 22, 23, 24, and 25, 1867, and the premiums offered amounted to $380 00.

7. The fair which has just closed was, for the first, very successful. There was not very much interest manifested in the exhibition of produce; but on the 3d and 4th days great interest was shown in the fine and fast horses, mules, etc.

The fair closed with an interesting address on agriculture and improvement by Capt. L. M. Andrews.

The proceeds of the fair are as follows: Membership fees, $340; per centage on value of premiums offered (paid by non-members, etc.), $57 70; sales of articles donated, $8 25.

A number of those who obtained premiums generously donated their warrants for the same back to the society, amounting to $67 60.

The expenses of the fair are as follows: Amount of warrants issued for premiums, $300; for advertising, etc., and 2400 tickets, for 150 badges, services of gate-keeper and secretary, and incidental, $23.

The board avail themselves of this opportunity of returning thanks to the members of the society for liberal donations and the laudable zeal manifested in the agricultural and mechanical interests of the county.

JOHN D. ALLEN, *President.*

MADISON COUNTY.—S. C. COLLIER.

Madison county was organized in the year 1818, and is situated about one hundred miles south of St. Louis, and about thirty miles from the Mississippi river. Fredericktown, the county seat, is twenty-two miles southeast of Pilot Knob, the present terminus of the St. Louis and Iron Mountain railroad. The county embraces an area of about six hundred square miles. Of this extent of territory there are some eighteen or twenty thousand acres in cultivation.

The face of the country is very rough and broken, being covered with low chert, granite, and porphyry hills, some of which rise to the hight of seven hundred feet above the level of the St. Francis river. The bottom lands along the Big and Little St. Francis rivers are of an excellent quality, and, when properly cultivated, will yield from fifty to seventy bushels of corn to the acre, thirty bushels of oats, and fifteen of wheat. I do not suppose that one-half of the good arable land of the county is in cultivation. There are also large bodies of upland, or "flat woods," in the county, well adapted to the growing of small grains and fruits; and judging from the abundance of wild grapes covering the bushes, I presume the cultivated grape might be successfully raised.

The information furnished by the assessor of the products of this county for the year 1867, should not be taken as a correct criterion from which to judge of the productiveness of our farms. I have no idea that our county was ever before visited with such a drouth as that of last season. My recollection of the county extends back thirty years, and I know I have never seen the watercourses, in all that period, as low as they have been up to the last few days. In consequence of this drouth, corn, potatoes, turnips, etc., did not equal half a usual crop.

Notwithstanding the small proportion of good farming land in our county, it might be made a very extensive stock raising country, and is perhaps better adapted to this than to any other branch of farming. All our tillable lands produce well of rye, oats, timothy, herd grass, and clover, and the shortness and mildness of our winters do not require us to feed our stock near as long as other counties further north. There are tens of thousands of acres of our hill lands that will never be inclosed, and these afford an excellent pasturage for more than half the year. I think this county eminently adapted to sheep raising, and have no doubt money could be made by any prudent man who would engage in that business. Prior to the war many of our farmers were employed in the business of stock raising, but the war came, like a desert simoon, and withered everything.

There are doubtless few counties in the State better watered than this. The Big St. Francis river on the west, and Castor river on the eastern side of the county, extend entirely through it, and their numerous tributaries run through it in every direction, while a multitude of clear, cold springs gush out from the hillsides and along the margins of the streams.

I have often thought that the people of that portion of Missouri denominated the "Southeast" might, with the proper enterprise, industry, and energy, become the most independent in the world. We can produce all the beef, pork, mutton, and poultry; all the corn, wheat, rye, oats, barley, clover, timothy, herd grass, etc.; all the potatoes, turnips, cabbages, beans, onions, melons, and other vegetables of this latitude; all the wool, hemp, flax, cotton, tobacco; all the apples, peaches, pears, cherries, plums, grapes, etc.; all the sugar and molasses; all the cider, wine, whisky, peach and apple brandy, rum, etc.; all the honey, beeswax, tallow, feathers, leather, etc., we need; we can raise all the horses, mules, and oxen we require; we have vast forests of pine to furnish us with lumber and shingles, tar, turpentine, and resin; we have cypress, poplar, cellar, black walnut, cherry, hickory, and white oak to furnish us with vessels, and wagons, and carriages, and farming utensils, and furniture. Of minerals we have iron, lead, copper, cobalt, nickel, zinc, manganese, bismuth, asbestos, wolfram, sulphur, saltpeter, with a small sprinkling of gold, silver, platinum, and tin. We have an abundance of beautiful marble and fine stone for building, for making grindstones, millstones, and whetstones; we have good free clays, clays for making crocks, jugs, bricks, pipes, etc., as well as excellent silex for making glass; we have salt springs, sulphur springs, and chalybeate springs, and many medicinal herbs, roots, and barks. Of all the articles and things above enumerated, Southeast Missouri can furnish more than she needs, excepting gold, silver, platinum, and tin. We need only the requisite energy, industry, and enterprise to become well nigh independent of the rest of the world.

Mines and Minerals.—Madison county has an honorable reputation as a "mineral county." I doubt if there is in the world an equal extent of territory containing so great a variety of minerals, iron, lead, copper, cobalt, nickel, zinc, manganese, bismuth, asbestos, wolfram, sulphur, saltpeter, gold, silver, and tin, as it exists in this county; without enumerating the different clays, earths, marbles, rocks, etc., that may become valuable and useful to man.

The only mine that has been profitably wrought in this county is mine La Motte, situated four miles north of Fredericktown. This is one of the oldest and perhaps most extensive lead mines in the State. It was worked as far back as 1722. The mine La Motte domain contains 21,010 acres. The "mines" proper, as yet known and developed, are about one mile in width and three in length, and produced in 1867 1,312,130 pounds of lead. I think the average price for lead for that year was about eight cents per pound, making this lead worth $104,960 40, and was the product of the labor of not more than one hundred men. When we take into consideration the extent of the lead district of mine La Motte (one mile by three), we may conclude it will afford "ample room and verge enough" for one thousand men to mine upon. Let us suppose this thousand to produce only one-third as much in proportion as the hundred men (and I don't know any reason for this supposition), and we would have as the product of mine La Motte the sum of $349,666 upon its lead alone.

I have head it frequently stated by persons competent to judge that the copper, cobalt, and nickel of mine La Motte are of more value than its lead, and I think it extremely probable this is so. You can thus form some idea of what the resources of mine La Motte will be when it falls into the hands of a company who will work it themselves or let others work it. If the value of its copper, cobalt, and nickel products should equal the value of its lead products, then this property would produce the sum of $699,332. Suppose it costs two-thirds of this sum to place these products in market (and this is an extravagant allowance), we would then have $233,110 as the net value of the products of mine La Motte for one year. Any company competent to manage such property as this could well afford to pay one million dollars for this property, for in ten years it would get back its money, with ten per cent. interest thereon, besides 24,010 acres of land, a great deal of which is good farming land.

The Buckeye copper mine, situated about one mile southeast of Fredericktown, has never yielded its proprietors anything; but I am disposed to attribute its failure to the worst possible management, rather than to any fault of the mine. I am of the opinion that this mine will be one day successfully and profitably wrought.

The Marshall, Dillon, Carmack, and Ware copper mines, in this county, have never been sufficiently wrought to determine their value.

We must wait for time to prove what the result of the tin discovery will be. That the ore contains tin, is beyond doubt, and a fact the knowledge of which is no new thing. Tin has been known to exist in this county for twenty-five years, but the per centage was supposed to be too small to be profitably worked; and I do not know that the contrary has as yet been proved. Should it be demonstrated that these tin ores can be profitably wrought, then the resources of our county will be largely increased, as there is an abundance of the ore.

Of iron we have an abundance, but, owing to our distance from river and railroad, it has not been regarded as of any value, and there are no iron furnaces in our county.

Gold and silver certainly exist, and it is said platina; and if our quartz leads were somewhere else they would be thoroughly tested.

Outside of the limits of mine La Motte no mines of lead have been worked, though there are several good prospects in the county.

Timber.—Our county is well timbered. There is no such thing as prairie in it. All that portion of our county lying south of the line dividing townships 32 and 33, and embracing eight congressional townships, and about 184,320 acres, may be properly denominated pine lands, since there is scarcely a section which is not more or less pine. A great part of this portion of our county is densely covered with pine. I think at least one-half, or 92,160 acres.

I think it a low estimate to say that this land will average 2,000 feet of lumber and 30 cords of wood to the acre. Lumber is worth at our mill $15 per thousand feet, making each acre produce $30 worth of lumber. Thirty cords of pine wood will make at least 900 bushels charcoal (or 30 bushels coal to the cord). Coal is now being delivered to the furnaces at nine cents per bushel, making $81 worth of coal as the product of each acre, so that we have $111 as the total product of each acre. This looks extravagant, but I know there are many thousand acres that will produce this amount of lumber and coal. Suppose it costs two thirds of this sum to convey this lumber and coal to market, we would have $37 as the net proceeds of each acre; and yet these lands were sold by the government at 12½ cents per acre. There is no probability that lumber or charcoal will become any cheaper.

I look upon it as certain that we are soon to have a railroad running through our county, in the vicinity of Fredericktown. The railroad will bring capital and live men into our county, and then its resources, which are now *in futuro*, will become realities; and many things, now unnoticed and uncared for, will become of value and contribute to increase the value of the products of Madison county.

MARION COUNTY—S. F. TAFT.

DR. L. D. MORSE: Since my last report we have past one of the most peculiar seasons that tradition speaks of through the mouth of the "oldest inhabitant." The spring was very wet, and as a matter of necessity the ground did not receive that tillage which it should to prepare it properly to receive the seed. A large acreage was sown and planted last spring; some of it was put in as well as circumstances would permit, but I am sorry to say a great deal was put in very slovenly, more so than need to have been. The rains continued until about the fourth of July, at which time I do not think over one-half of the corn had been plowed once. Harvest came on, and had to be attended to. Many left their corn unplowed to attend to harvesting, with a promise to give it a good plowing after harvest was over. The weather continued dry during harvest, and the ground baked, and the consequence was that which had not been plowed in season could not be plowed now. This will bring the average of our corn crop very low. But the assessor not using the blanks furnished him by the Commissioner of Statistics, I can't give an accurate statistical report, but will approximate as near as possible.

In the corn crop we have suffered heavily, many good judges think more severely than the adjoining counties. I think twenty bushels per acre will not be too high for an average of those fields which were cultivated, and I don't think four bushels will be too low an average for those fields which received little or no cultivation. The crop is well matured, the ears being sound and well filled, and, when shelled, overruns the standard weight of 56 pounds to the measured bushel. It is estimated that there was one-third more acres planted to this crop than for several years past.

The wheat crop was good the past year, and harvested in fine condition. There was a hailstorm passed over a part of the county, injuring the crop considerably. I think 20 bushels per acre will not be too high for that portion of the county not visited by the storm, and 17 bushels for the county. There was a full average acreage harvested.

There has been a greater breadth of wheat sown the past fall than for years past, and, notwithstanding the extreme dry weather, it looked well when the winter set in; the roots have run very deep, and will not be as liable to be thrown out by the extremes of thawing and freezing as usual.

There was a large acreage of oats harvested, and yielded an average of about 45 bushels per acre.

Irish potatoes set very well, but ripened up smaller than usual. I think 60 bushels to the acre will be a full average; they are not rotting as yet.

Some patches of sweet potatoes yielded some very large specimens, while others did not do much; there was not far from a half crop.

There was not as large an acreage of hemp raised this year as usual. It is generally good.

The sorghum crop of the county is very small this year. Owing to low prices last year there was not over half as much planted as the year before, and some of that was plowed up and the ground planted to other crops. That which was left made a poor growth, so that it would not average over 50 gallons to the acre grown.

This has been a hard season for tobacco raisers. They had a great deal of difficulty in procuring plants, and the crop is not as heavy as usual, but is said to be a finer article where ripened. The inspection at Hannibal this season has been very small—only 53,000 pounds.

Timothy and clover were fine; there was probably one-third more hay cut in the county the past season than was ever cut at any one harvest before.

The condition of our herds of fat cattle is not as good as usual, although the graziers were very good; but when we look for the finer grades of corn-fed, there were very few to be found.

The hog crop has been unexpectedly large this year, though not as large as in former years before cholera got among the hogs, and when abundant corn crops were raised to fatten them on. Hannibal has cut 9500 hogs; average net weight, 192 pounds; average price paid, 6¼ gross; divide on 250 pounds. Palmyra has cut 2340 hogs; average weight, 200 pounds.

There has been considerable improvement in the way of mills in the county the past season. There have been five saw mills started, most of them having corn-cracker attachments. There was a saw and custom mill started on the Fabius, by John B. Barr, and a custom mill in Palmyra, by J. McPheeters, of the old mills. Hanly, Metcalf & Co.'s flouring mill, the capacity of which is 100 barrels in twelve hours, has ground 43,193 bushels of wheat since harvest. The average price paid for wheat was $2 per bushel, the lowest, $1 50, and the highest, $2 55 per bushel. This mill grinds about 300 bushels of corn per week.

S. H. Anderson & Co.'s flouring mill has a present capacity of 80 barrels in twelve hours. They calculated to put in new boilers in the spring, which will increase the capacity to 125 barrels in twelve hours. They also grind corn and buckwheat—of the latter about 1000 bushels per annum.

Hannibal has a new corn mill; also a large flour mill, by Swagart & Duback, with a capacity of 150 barrels in twelve hours. The old mill of Carter, Pindal & Co. runs 100 barrels in twelve hours, and Hewit & Co.'s about 60 barrels.

We have two tanneries in the county—one in Hannibal and one in Palmyra; the latter tans under the Japonica patent. Four wagon shops have opened the past year in the back part of the county.

Peaches this year were about a half crop, the seedling bearing, as a general thing, better than the budded trees, and those trees that had never been removed, but grew where the seed was dropped, bore the largest crops.

Apples were hardly a good half crop this year. The codling moth and apple maggot worked upon them badly. At least one-half of the apples gathered for winter had been perforated by them, so that it requires frequent overhauling, to prevent the whole from rotting at once, by removing them as they commence to rot.

Our bearing vineyards, mostly Catawba, have borne well again this year, still further demonstrating the fact that grape growing will pay here. A great quantity of our fruit is sold by the pound as yet; and still, from what was left, there has been about 1400 gallons of wine mode. This is in the vicinity of Hannibal. I cannot speak for the balance of the county, as I have no means of knowing. (Some have found fault with my last year's report, because I did not mention the names of fruit growers around Palmyra. I would say to all, please write and let me know your names and amount of fruit of all kinds you have planted, and I will try and make amends.) Westfall made about 800 gallons of wine. Several acres of grapes were set out last spring and fall, and preparations are being made to set more this spring. The planting of fruit of all kinds is gradually on the increase.

MERCER COUNTY.—J. A. GRADLE.

DR. L. D. MORSE—*Sir:* In compliance with your request, I will try to give you an agricultural report of this county as far as I can.

Mercer county is one of the north tier of counties of this State, bounded on the east by Putnam, on the south by Grundy, and on the west by Harrison. About one-half of the county is prairie and the other half is good timber, hard to beat in this western country; the prairie is rolling, the soil black, and produces well.

The county is well watered; the east fork of Grand river passes through the central part of it, from north to south, and is available for water power for manufacturing or any other purpose. Muddy creek, Honey creek, Big and Little Medicine creeks, and some other minor streams all pass through the county, from north to south.

We have almost every kind of timber that is to be found in the State, from the large oak to the hazel bush. Of wild fruits we have the crab apple, plum, cherry, haw, blackberry, gooseberry, raspberry, grapes, etc.

We have no government lands in this county. We have some non-resident lands, owned by speculators; but only in small tracts. The average price of improved farms is from ten to twenty-five dollars; unimproved land from four to ten dollars per acre.

We have limestone rock of all kinds and descriptions, which is used for lime and building purposes. We have also stone coal in the county, but mines have not been opened to any extent to give any definite description of it. No mining for ore of any kind has been done in this county.

We have several good mills—especially grist mills, but not enough to supply the demands of the county. We have also quite a number of steam saw mills, and all are doing good business.

Farming implements of rather a common kind are used, although a good many of our farmers are getting mowers, reapers, threshing machines, cultivators, etc. We have no agricultural implement manufactories in the county, yet there are wagons, buggies, plows, etc.. made here.

We have had an agricultural and mechanical society in this county for years; it was organized in 1859. J. A. Kennedy, A. Bruce, W. R. McKinley, J. J. Clark, and others were men most active in getting up the society. In 1859 and 1860 we had most excellent fairs, and the society was in a flourishing condition; but the war coming up as it did in 1861, the agricultural interest gave way until we had almost as good as no society for four years. Now it is making rapid strides, and we expect to have as good fairs again in this county as can be found in North Missouri. W. R. McKinley, W. Lowry, S. Oachell, C. Yokem, S. Humphrey, M. Powell, J. C. Smith, D. J. Duree, and S. L. Storms are the present directors of the society.

The principal productions are wheat, oats, corn, potatoes, etc. Wheat, if properly put in and in the right time, does well; from fifteen to twenty bushels are raised to the acre. Oats is almost a sure crop, and is raised in abundance; from thirty to forty bushels are raised to the acre. Corn is an old favorite crop and is raised very extensively; forty bushels is a good average crop. The yellow corn is preferred for stock. The corn crop is fed to hogs and cattle. The hogs are driven to the nearest railroad in Iowa, and shipped to Chicago; the same with cattle.

But little rye and barley are raised here.

Buckwheat is raised with good success.

Potatoes do well and are raised in abundance.

Sorghum is raised for home consumption in the way of molasses only, but does well.

Hemp, flax, cotton, and tobacco are grown only in "patches," and amount to but very little with us.

We have no large flocks of sheep. Little attention is paid to sheep raising, and but few fine breeds are found in the county; still, sheep seem to do well, and are generally healthy.

Considerable tame grass is raised mostly, timothy. Prairie hay is fast in the decline. Timothy does well and grows most anywhere; we raise from one and a half to two tons per acre. Hungarian is considered worthless.

Hedges are being tried here now to some extent. We had a company here taking contracts of our prairie farmers to plant and tend the hedge three years at seventy-five cents per rod.

Horses and mules are raised for home use, and some few are shipped, mostly to St. Louis. There is not as much attention paid to improve the breed of horses as there should be.

Orchards are to be found on nearly every farm, mostly young, though. Our farmers used to think that a fruit tree would not grow on our prairies, but they have got bravely over that. About as good orchards as we have in the county are on the prairie. The best apples on exhibition at our fair this fall were exhibited by prairie farmers. Our orchards consist of hardy varieties of trees, mostly fall and winter apples.

Dwarf pears do well.

Grapes are rather a new thing with us here. They are not grown to any extent; still, we have nearly all kinds, and where they are well cultivated and taken care of, do first rate and bear well.

Our farmers are abandoning the "old way of farming." They have found out that raising corn with an old shovel plow will do no longer. I hear of a great many sending orders for subsoil apparatus to attach to their plows in the spring. Subsoiling will receive a fair trial here next spring, and there is no doubt but that it will pay; but about that we will give a more definite report in our next.

MISSISSIPPI COUNTY.

The county contains about two hundred and sixty thousand acres of land, most of which is susceptible of cultivation, and is a rich alluvial soil called, in western parlance, "river bottom," a soil every way as productive as the delta of ancient Egypt. Owing to the peninsular shape of the county, being nearly surrounded by the river, and the fact that a large water course (James bayou) runs through its center almost the entire length, having as much fall in twenty-one miles as the river has in seventy-five, it is susceptible of being drained at a trifling expense. Probably there is not, in all Southeast Missouri, an equal amount of land that can be drained and made arable with so little labor.

As is the case with all river bottoms, parts of it are subject to occasional inundations that, for the time, are somewhat inconvenient; but they leave the soil so much more fertile and easily worked, as to be considered rather an advantage than otherwise.

The county has built about thirty miles of levee, at an expense of nearly one hundred thousand dollars. While it was new, and before it had become firm and settled, the high water of 1858 broke it in several places, and no efforts have been made to repair it. All these levees have now become solid and firm as the natural earth, and a comparatively small amount of funds will protect most of the county from all danger of overflow.

Being entirely "river bottom," of course there is not a hill in the county, unless some hundred "Indian mounds" are entitled to that appellation, nor a rock of any considerable size, except it has been imported for foundations, cornerstones, or obituary purposes.

Brick, however, of the best quality, can be made; and, with them and the superabundance of timber, the want of rock is little felt.

Clay for brick abounds in the county, and there is scarcely a section of land but what has clay from which brick can be made.

Most of the county is heavily timbered. Upon the river, and several miles back, the predominant growth is cottonwood, a timber of rapid growth, large size, and splitting freely, making it valuable for rails and steamboat wood. Intermixed with it, and reaching through the county, is elm, hackberry, catalpa, honey locust, black locust, walnut, all the varieties of oak (white, red, black, overcup, chincapin, post oak, and black jack), sugar tree, maple, hickory, coffee nut, linn or basswood, persimmon, pecan, mulberry, boxwood, sweet and black gum, dogwood, pawpaw, redbud, spicewood, etc.

Upon the water courses and in the low grounds are immense brakes or groves of cypress, a timber equal to pine for building purposes, and superior to it for outdoor work, such as weatherboarding, shingles, and fencing.

There are three small prairies in the county—"Matthews' prairie," in township 26, range 16, being some four miles long by about two wide; "Long prairie," in township 26, range 15, some four miles long by one wide, and "East prairie," in township 25, range 15, of about the same size.

Crops.—The staple crop of the county is corn, yielding from forty to one hundred bushels per acre. Wheat does very well in the prairies and the older cultivated lands. Hemp and tobacco have been cultivated only to a limited extent, the objection being that they grow too large. Oats do well, and the coarser grasses, such as timothy, grow very luxuriantly, producing three and four tons to the acre.

Garden vegetables attain a size that would be deemed fabulous in the hills, or under a more northern clime.

Apples are very fine, but as yet there are few orchards—an evil that a short time will remedy.

Peaches are easily raised, but little care has been taken in the selection of varieties.

All the small fruit, such as plums, cherries, strawberries, etc., grow luxuriantly, and require but little cultivation to make large crops.

Millet grows very large, and the Hungarian grass is admirably adapted to our rich soil.

The root crops, such as Irish potatoes, sweet potatoes, yams, turnips, onions, etc., grow very fine, and yield largely to the acre; so do pumpkins, squashes, melons, and the leguminous vegetables.

Cotton grows finely in this county, New Madrid, Pemiscot, and Dunklin, which are called the swamp counties. Several years ago a considerable quantity of cotton was raised, but the low price of that article, and the high price of corn and pork, caused the cotton crop to be neglected. Since the war attention has been turned to raising cotton, and it now bids fair to be a leading crop. There are two cotton gins in the county, one at Charleston and one at Bertrand—also one in the edge of Scott county—all of them having been crowded with work the last season.

Towns.—Charleston is a pleasant village, situated in Matthews' prairie, and surrounded by fine plantations. It is the county seat, has a large two-story courthouse, clerk's office, and other public buildings.

The Methodist Episcopal church has a large brick house of worship, said to be the finest Protestant church in the State south of St. Louis.

The Baptists have a very neat church nearly completed, which will be decidedly an ornament to the place.

There is a large and commodious hotel, six drygoods stores, two grocery stores, a drug store, two saloons, one stove and hardware store, cotton gin, saddler's shop, tinner's shop, blacksmith's shop, three tailors, two shoe shops, and a printing office, from which issues, weekly, the Charleston Courier.

The Cairo and Fulton railroad passes through town, making it the first regular station from the river—distance twelve miles—and it was contemplated to connect with the Mobile road by a branch from this place to Belmont. Captain Williams, chief engineer, in making the surveys and location of the Cairo and Fulton railroad, selected this place as the point for machine shops, for which it is peculiarly eligible, the prairie furnishing beautiful sites for the residences of the workmen, and the means of living being very cheap.

Bird's Point is directly opposite Cairo, and is the terminus of the Cairo and Fulton railroad. As the railroad has stopped running, but little business is now doing.

Greenfield's Landing, five miles above Bird's Pont, is the shipping place for a large scope of back country. It has a good ferry and is a place of much crossing to Cairo.

Norfolk is a small village on the river, about five miles below Bird's Point, and is the shipping place for Rush's Ridge, one of the best farming portions of the county.

Belmont, named after the American partner of the Rothchilds, is immediately opposite the depot of the Mobile and Ohio railroad, at Columbus. The State road through the counties of Cape Girardeau, Scott and Mississippi, and the contemplated Pilot Knob and Belmont railroad, both terminate at that point, it being the best crossing place on the river between Cairo and the Balize, long and familiarly known as the "Iron Banks Ferry." The place was selected as the terminus of the Iron Mountain railroad, by the engineer, J. H. Morley, and so appears on the map and report of the company to the Legislature in 1853; and also the terminus of a branch of the Cairo and Fulton railroad, to connect with the Mobile and Ohio railroad, as being the best crossing place he could find anywhere near the mouth of the Ohio, and he accordingly terminated the Mobile and Ohio railroad at Columbus.

Bertrand is a new town at the depot of the railroad in Long Prairie. It is situated in the center of the finest farming land in our county, and will no doubt make a place of some importance.

Wolf Island lies immediately below Belmont, and has given name to the township lying back of it on the main shore. Wolf Island township is one of our best farming districts, and its lands sell higher than other portions of this county.

St. James is on the Mississippi river, at the mouth of James' bayou. There is a saw mill at the place, which is doing a fine business, but as yet unable to supply the demand for lumber. Upon the banks of James' bayou and its tributary—the Black bayou—there are large brakes, or groves, of the finest cypress timber in the world; also, in the surrounding country there is plenty of walnut, gum, oak, and other timber—enough to make this place one of the greatest lumber markets in the West.

East prairie and Long prairie are both fine tracts of land, as also is Shelly's ridge, Rush's ridge, and the country back of Belmont. Indeed, the whole county is susceptible of being made a perfect garden—the soil being a warm, fertile loam, which can be rendered dry in the wettest season by a little drainage, and rich enough to produce everything that can mature in this latitude.

Both saw and grist mills are badly needed in the county, and a flouring mill at Charleston would soon make its owner a fortune.

We think the county a desirable one for emigrants. Richer soil or closer markets can scarcely be found. True, the lands here are not as cheap as they are in the back counties—the old times of Congress price, $1 25 per acre, has passed away, never to return. Still our county offers superior advantages to settlers. The land is as rich and productive as land can be. All manner of crops suited to the latitude are as sure and plentiful as in any other portion of the country. The markets are closer and more convenient than any other place we know of, being as it were at our own doors.

As specimens of what the county can do—and has done—in the vegetable line, we enumerate a few articles sent to the office of the Charleston Courier. Of course they were above the ordinary average in size, but are referred to as examples of what has been grown in the county:

BEETS.

James B. Garfield—beet that weighed 14½ pounds.
James Lee—10 pounds, 22 inches in circumference.
Robert Mercer—17½ pounds, 32 inches in circumference.
Captain John Bird—9½ pounds, 27 inches in circumference.
George H. Bartlett—14 pounds, 23 inches in circumference.

SWEET POTATOES.

F. J. Jecko—one 60 inches (5 feet) long.
Captain Bird—weight 9½ pounds, 22 inches in circumference.
Zadok S. Jett—2 feet long, 17 inches in circumference.

TURNIPS.

James Lee—11½ pounds, 29½ inches in circumference.
H. Kays—40 inches circumference.
Quiros Beckwith—17½ pounds, 37 inches in circumference.

MISCELLANEOUS.

James Hagan, on the Means farm, in 1866, realized $1100 on Irish potatoes raised on a few acres of ground.

J. S. Goodin—corn stalks, 18 feet high
George Harned—timothy, 6 feet 2 inches high.
Thomas Brown, jr.—blue grass, 7 feet 5 inches high.
William T. Lee—wheat, 6 feet.
James H. Naive—rye, heads 7½ inches long.
John Swank—millet, 8 feet high.
Joseph T. Russell—peaches, weight 9 ounces.
A. M. Holloway—sorghum, 19 feet 10 inches high.
Mrs. Stanley—watermelon, weight 45½ pounds.
Thomas L. Brown—watermelon that measured 32 inches.

Captain Bird, in 1860, had his wheat crop in market in St. Louis on the 14th of June, and afterward raised a crop of corn on the same ground, being two crops in one year.

The country abounds with game—deer, turkeys, geese, ducks, swans, and the smaller game is very plenty, and there is an abundance of fish in the lakes and bayous, for those who seek pleasure in the piscatorial line.

The morals of the county are good— perhaps better than our older settled neighbors. There is seldom any horse racing, gambling, or rowdyism of any kind, and the people will compare favorably with older counties in point of morals, sobriety, and good behavior, making it a desirable location for such emigrants as wish to find rich and new lands, and still keep within the boundaries of civilization.

To those who think that no good can come out of the swamp country, we say, as Philip said to Nathaniel, "*Come and see.*"

MORGAN COUNTY.—JOHN H. GUNN.

The general surface of the county may be properly termed undulating, though a portion of the timbered section bordering on the Osage river is decidedly hilly. About one-half of the county is prairie. Streams, bordered with fine timber, occur at convenient intervals in the prairie section. This portion of the county is highly fertile, and well adapted to raising all varieties of grain, while the ample supply of water makes it unsurpassed as a stock-raising county. The southern portion of the county, watered by the Osage and its tributaries, the Big and Little Groovis, Proctor, Big and Little Buffalo creeks, is splendidly timbered and finely watered by springs of all sizes and varieties, many capable of furnishing power for all needed mechanical purposes in all seasons of the year. Humes' spring is now running a grist mill and saw mill, and during the summer season a carding machine, and all within 1200 yards of its source—the illy-arranged adaptation of the power not consuming one sixteenth part of the available force of the spring.

Timber.—The timber trees most generally found in the county are the different varieties of oak and hickory common to the State; white and blue ash, black and honey locust, red and white elm, sugar and silver leaf maple, sycamore, dogwood, redbud, black and white walnut; while occasionally, in localites suited to their growth, are linn, tupels, sassafras, ironwood or swamp beech, blackjack, pawpaw, persimmon, spicewood, black gum, and mulberry.

Wild fruits.—We have grapes in all varieties of size and flavor, crab apple, plum and sloe, red haw, black haw, serviceberry, persimmon, pawpaw, blackberries, raspberries, strawberries, and wild cherries.

Lands.—There are probably at the present time no more than 300 acres of government land in the county--of no value except, perhaps, for undeveloped minerals. One-fifth of the land is owned by non-residents, entered under the graduation law—none by corporations. Improved lands are worth an average of twelve dollars per acre.

Minerals.—Limestone of several kinds occurs in the coal measures, and in the lead regions a fine magnesian stone, known as cotton rock, occurs plentifully; its softness renders it easily worked, and highly valuable for building purposes. Occasionally fine beds of red sandstone occur, but is generally of no use, being too friable. Coal, bituminous, anthracite, and cannel, is found generally distributed in good quality and quantity, but is only mined for local use; but bituminous and cannel coal, as fine as the State can produce, and in exhaustible quantites, occurs almost within the limits of Versailles, the county seat. No mines of other minerals are now worked, although lead is found everywhere. Arrangements are now being made to develop the lead of this county, and the prospect of an addition to our wealth through this source is highly flattering. No positive indications of coal oil have yet been found, although all the geological signs are frequently seen.

Mills.—We have six flour mills in this county, two of which run by steam, the remainder, beside several saw mills and corn mills, being run by water. There are also four steam saw mills now running. At several of these mills are custom carding machines, for the purpose of furnishing "rolls" to keep the primitive "wheels" going; but no woolen factories, properly speaking, have yet made their appearance. A nice fortune awaits the lucky man whose enterprise and capital shall first be drawn into this business, for we have a fine sheep country, and the wool clip at the present time is no small one, and nature furnishes the power to him who will only use it.

Implements.—With the close of the war and the extinction of the old dynasty, Morgan county, in common with her sister counties, accepted the situation; and with the situation came the "Yankee" as a permanent institution, and with the Yankee came the improved farm machinery. The older inhabitants, although conservative in character, and not given to the rash adoption of anything emanating from the universal Yankee, are imitative people—most especially will they imitate the man who can make the most money with the least labor. As a natural sequence we are now partially supplied with the most approved farming implements and labor-saving machinery, although nothing further than a good quality of plows and harrows are manufactured here.

No agricultural societies are in existence, and no fairs have been held for a number of years. About one-fifth of the county is in cultivation. Our principal productions are wheat, Indian corn, rye, oats, potatoes, and buckwheat.

Wheat.—Fall wheat is the only kind cultivated; average yield, thirty bushels per acre, without drilling, subsoiling, or underdraining. Drilling, which is now being introduced, will increase the crop. Wheat is A No. 1—in fact, this is the leading crop, and the most profitable to our famers.

Corn.—Average yield, fifty bushels per acre, principally yellow corn, for stock. It is fed on the stalk from shocks which are put up in the fall, just as the corn is thoroughly hardened and the husk is beginning to dry. No corn is shipped from this county, being fed to stock, and no market will pay the farmer half so well as to feed to young stock. But little rye is raised, and that for home consumption among our German citizens. The same may be said of buckwheat, although both produce fine crops.

Sorghum—Is extensively cultivated, almost every farmer having his "patch of molasses corn," which, with the same soil and cultivation as Indian corn, produces finely. No sugar has yet been made; the sirup, boiled down in kettles, after being crushed out of the canes by wooden or cast-iron mills, furnishes an abundant supply of molasses.

No hemp is cultivated, although a portion of the county is well adapted to its growth. Neither flax, cotton, or tobacco are much cultivated, but all produce finely.

Sheep.—No improved varieties; but considerable attention is paid to the raising of native varieties. Nearly every farmer has his flock. This stock will be an important matter in the future of this county; hundreds of acres of our Osage hills being splendidly adapted to sheep raising, having fine water and pasturage in the valleys, and a climate unsurpassed on account of the natural barriers which the hills interpose to blasts of winter.

Hedges.—Osage orange has been tried to some extent, and although its growth and hardiness is all that could be desired, careless management has prevented it (in any instance within the knowledge of the writer) from making a fence.

Hogs—Are very generally raised, and are generally slaughtered at home and marketed in the form of bacon—usually killed when about eighteen months old, and average weight of 200 pounds net. We have no improved breeds, although there is a very fair stock of old breeds.

Cattle.—No cattle are slaughtered for export. Cattle are marketed alive at three and four years of age, driven to the railroad, and shipped.

to St. Louis. But few cattle of improved breeds have been introduced. There are no dairies in the county.

Horses.—Average price $100; principally light stock for farm and saddle horses. No effort for improvement in horses is being made in any direction.

Mules—Have been heretofore favorites with stock raisers, but the present low price has had a tendency to depress mule raising, and will probably result in the introduction of the finer breeds of horses. Mules have heretofore been marketed in St. Louis, or at the western cities of the State for use on the plains, and have brought good prices.

Fruit.—People are generally raising orchards with fine success. Soil and climate are well adapted to raising all kinds of fruits. There are no professional fruit growers. Apples: A few years will full develop the success of all known varieties of apples in this county, as it is largely planted at present. In the bearing orchards the geniting has the full sway for a winter apple, although limber twig, golden pippin, yellow bellefleur, and Pennsylvania redstreak are all doing finely, and are favorites. The older orchards were seedlings or water sprouts, and are few and far between, with very little fruit worth anything. Peaches: This is the natural home of the peach, although none but the old seedlings are yet in bearing; but judging by these when our young orchards get in bearing we will be able to show peaches with any one.

No vineyards have been planted, but judging from the success of grapes in our gardens they would do well; in fact, grape growing will one day be a leading feature of the south part of the county. Nature has done everything in her power to so make it, and man has but to plant the vine, and there can be no doubt as to the result. There is no better opening in the State for experienced vine growers than in this county. Land that the world cannot excel for that purpose can be had in any desired quantity for $1 per acre.

The short time in which this report was prepared will forbid general remarks on the topics requested, and not being at present in a position to ascertain the statistical facts desired, the report is forwarded without them—merely adding that should it be in the power of the writer to make a report after this more time and care will be expended to ascertain those facts, and make the report more full and complete.

MONROE COUNTY.—J. C. Fox.

Our county is about equally divided between timber land and prairie land. The lands of the county are generally high and rolling. A very small part of the county is of the lands commonly called flat. The soil is clayey loam and very fertile, but not so rich as the Missouri bottom, but producing a greater variety of agricultural products. On the northern boundary of the county we have the north fork of Salt river traversing the county from west to east, and this is the general direction of all our streams. In the central portion of the county we have the middle fork of Salt river, and south of that the Elk fork of Salt river, and on the eastern border of our county we have the south fork of Salt river; in addition, we have Indian creek, Otter creek, Crooked creek, Bear creek, Davis creek, Bee creek, Long

Branch, and a great many others that afford abundance of stock water the year around, and are never dry. These creeks are all tributaries to the main forks of Salt river above described, and these forks have their confluence at or near Florida, in the eastern part of the county, where there are now two excellent mills running almost the year around by water; indeed there is at this place water power enough to run any amount of machinery for an average of nine months in the year. Skirting all these streams are forests of fine timber, consisting of all the varieties of oak and hickory, honey locust, hackberry, red and white elm, black and white walnut, sycamore, birch, cottonwood, linn, ash, and mulberry; and taking the county altogether, there can be but few better timbered and watered bodies of land anywhere than Monroe county.

In the way of mild fruits we have grapes, plums, gooseberries, blackberries, strawberries, serviceberries, and all plentiful in their season. The government lands, if any, are of the worst grade.

The average of improved farms is about $13 per acre, and of unimproved lands about $6 per acre. The lands are mostly owned by individuals, residents and non-residents—mostly by residents. There is a large amount of land for sale. If a farm is not for sale it is an exception. Most of the lands can be bought at prices that will make all the money put into them good investment.

We have plenty of all kinds of building material except pine lumber; white limestone of the finest quality. Coal of a good quality can be found in almost any section of land in the county. There are immense fields of coal in the county.

We have some four large flouring mills in the county, and some twenty saw mills, all doing a good business. We also have at Paris, the county seat, a large woolen factory, at which all kinds of woolen cloths are made. Three looms are running constantly by steam.

Our people are beginning to awaken to a realization of the importance of agricultural machinery. Various kinds have been introduced in the last four years, with which those using them are greatly pleased.

We have an agricultural society here that has been in operation for a number of years, which was suspended during the war. The annual meeting of the society last year was a complete success. The display of horses, cattle, sheep, and hogs would be a credit to any county. Some of our county men who exhibited stock at our fair took them to St. Louis to the fair last fall, and almost all the stock taken received premiums. Among the number Mr. J. Clark, on his stallion, "John Randolph;" R. D. McCann, on his shorthorn bull, "Accident No. 3;" Jeff. Bridgeford, on aged mule, and others not now remembered. This shows our stock to be equal to that of any of the Western States, for they were all represented at St. Louis last fall.

Mules, cattle, and hogs are the principal stock that is raised in the county for market, all of which has heretofore been very successful, and promises a good yield of profits in the future, except mules, which are not so promising as heretofore, owing to the unsettled condition of the Southern States—our mule market. But the Yankee mind is of too practical a turn, we think, not to remedy the cause of this mule depression in some way.

The productions of the county are chiefly corn, wheat, rye, oats, buckwheat, potatoes, sorghum, and tobacco; timothy, clover, blue grass, and Hungarian grass. Where the land is properly cultivated we can usually expect a yield of corn from forty to fifty bushels to the acre; but if poorly cultivated, then much less.

In good seasons we have an average of from twenty to thirty bushels of wheat to the acre; but this crop receives but little attention by our farmers. Their mode of cultivating wheat is a perfect butchery. They butcher their ground by half plowing; pay no attention to manuring or rotation of crops; sow broadcast, without any system; and if the season is good they make a good crop—if not, they fail. There can be no doubt that with proper care and cultivation wheat could be made a profitable crop. If cultivated in the same manner, there is no doubt that we can raise as much wheat per acre as Pennsylvania or Virginia. The other grains yield well when cultivated properly.

We have as good grass land as any in the world. We have large quantities of wild prairie grass, upon which stock in the summer season gets fat. Hay is almost a sure crop; so is clover and Hungarian. But the grass to which our soil seems peculiarly adapted is blue grass. This is a very profitable crop. A pasture that is well set in blue grass, our farmers think, is worth acre for acre with an average crop of corn. Stock gets very fat on it, and when let grown all summer it falls down, and the earth is covered with a thick mat that furnishes excellent pasturage all winter, and has the double advantage, that it requires no cultivation and no labor to feed it. During a sleet or heavy frozen snow cattle cannot get the grass, and have to be fed, but this is generally but a little while; but horses, mules, and sheep, if in a pasture of well-set blue grass, have no need of any other feed during the entire winter.

We have no fruits except such as are cultivated for the individual use of farmers. We have as fine apples as any county. Our peach crop only hits once in a great while. Out of six years we will have peaches two or three times. All other fruits common to this latitude do well here. Enough is known from the experiments of farmers in their gardens that grapes can be profitably cultivated here.

The Hannibal and St. Joseph railroad runs along the entire northern border of our county, and the North Missouri railroad nearly touches the western border of our county, and is convenient to the eastern part of the county, and we hope soon to see a railroad, already projected, running through the center of the county from east to west.

Our great need in this county is practical, energetic farmers. The great bulk of our lands have never been cultivated.

Our people are quiet, orderly, law-abiding citizens, and at all times ready to welcome to our midst honest, industrious men and women.

McDONALD COUNTY.—ALBERT W. CHENOWETH.

The county of McDonald is the extreme southwestern one in the State of Missouri; on the west we have the Cherokee Nation, on the south the (as yet) unreconstructed State of Arkansas. From north to south the county measures eighteen miles; from east to west thirty-one miles are included within its limits. The county is for the most part broken, the center of the county being the most elevated portion. In the four different corners of the county we have a like number of spots of prairie land equaling an average of one township to each locality. We have Big Sugar creek, Little Sugar creek, Indian creek, Elk river, and Buffalo creek, besides seven or eight other streams of less magnitude traversing the county, and affording an abundance of the purest water during the entire season, both for man and beast, being supported by the numerous fine springs to be found everywhere throughout the county; and while furnishing a never-failing supply of the crystal fluid, our streams furnish us with bottom lands that can scarcely be surpassed in fertility by the most favored portions of the continent. We have many fine valley farms, a kind of second bottom—a dark soil mixed with gravel, yielding abundantly. We also have another quality of lands—that which is or was timbered, being mostly contiguous to prairie and denominated "flatwood" lands. With proper cultivation (early planting being important) this description of land gives a profitable return to the labor of the farmer, and, indeed, is generally conceded to be our best soil for the production of small grain.

Our county is well supplied with timber of the different varieties common to this latitude; we have pine, cedar, all the oaks, hickory, ash, hackberry, dogwood, the gums, walnut, maple, locust, mulberry, sassafras, etc., etc. We have four steam saw and grist mills and two saw and grist mills in the county propelled by water power, all of which are doing a thriving business. Our streams in many localities furnish fine mill sites, but cheap fuel and the advantage of portable mills has as yet prevented their resources being turned to account. Good unimproved lands can be bought at from three to ten dollars per acre; improved farms rate at from five to twenty-five dollars per acre. In fact, there is no settled price. Land is cheap enough however, and if buyers can find locations to suit, they can generally purchase on reasonable terms.

We have neither machine shops nor manufactories in this locality as yet, and labor on the farms is accomplished by the aid of the commonest implements; the era of reapers, mowers, cultivators, buggy-plows, etc., has not yet dawned upon us.

The population of this county is about five thousand souls, and there is perhaps about one-twentieth area of the county in cultivation, and not more than one-tenth area in cultivation that can be advantageously tilled.

The principal productions of this county are corn, wheat, oats, cotton, Irish and sweet potatoes, tobacco, Hungarian grass, sorghum, and fruits. An average yield per acre of some of the foregoing products in this portion of the county I can state as follows: corn, say fifty bushels, wheat twenty, oats fifty, Irish potatoes one hundred, sweet potatoes two hundred bushels to the acre, and of tobacco 1000 pounds. Cotton is not much cultivated, which is very surprising, as it yields well and can be very profitably raised.

The above is the average actual yield, etc. With superior cultivation the same can be doubled, or at least greatly increase.

Here we have the wild grape in all its varieties growing luxuriantly all over the county. I have seen ancient vines ten inches in circumference, loaded with luscious grapes, near the size of the common cherry. These large varieties ripen in August, or early in September, and are so abundant in many localities that they can be readily procured in sufficient quantities to make it profitable manufacturing them into wine. It is nothing unusual to see small vines trailing along on the ground, or perhaps supported at interval by small underbrush, producing the largest and most delicious fruit—a very fitting opportunity for swine, which find a congenial home in this county, multiplying and fattening with scarcely a care from their owners. Our county is certainly well adapted to the culture of the grape; for in its native condition, without culture, and laboring under all the difficulties of the annual fires of the country, and the rude treatment of both man and beast, they continue to grow and prosper, binding together the dense forests along the valleys, adorning our hillsides and even the summits of our mountains; and not content with this, they even visit our pineries, coiling their graceful forms around the stately pine. Some experiments made here in cultivating the Concord, Norton's Virginia, and Delaware grapes show their adaptation to our soil and climate. The Concord with us is the king of grapes; it grows and bears astonishingly. No vineyards of any note have as yet been established here; but the writer hereof is preparing to engage in the business, and knows of a surety that it will be his own fault if he does not succeed.

We have a climate here rivaling the sunny lands of Italy and Southern France. Our winters are exceedingly mild and open—so much so that cattle scarcely require any attention, living the winter months on the luxurious herbage along our valleys, where Jack Frost seldom enters with sufficient intensity to destroy the range.

We are here bordering on the famous Mason and Dixon line of 36° 30′—once the boundary of free labor, as defined by the immortal Clay. What wonder, then, that our climate should be the best in the United States? and who can be surprised, since the dark pall of human servitude is removed from our fair land, or marvel at the prediction, that this region is ultimately destined to become the Italy of America, and to be the great grape and fruit region of the world—being near the geographical center of the United States, and in close proximity to the great national thoroughfares that are ere long to unite with iron bands the North with the South? and taking into consideration the natural advantages heretofore enumerated, who may not prophesy, or in other words, what discerning mind is there that would not without hesitation prophesy, for Southwest Missouri a glorious future?

At present this portion of the State, notwithstanding all its natural advantages, is in embryo, perhaps just merging into existence in the eyes of the great world, who heretofore have scarcely known our country even on the atlas, much less the reality as it really exists. In proof of this I would state that notwithstanding the adaptation of our soil and climate to fruit growing there are but few orchards of choice fruit. The reason is obvious. We have been secluded in a great measure from the progress of the age, and as it is a known fact that where nature is most prodigal of her gifts man is most indolent, we have been in a great measure living on the bounties of Providence, making but puny efforts to keep up with the progress of the age in which we live; but a brighter day is dawning. Our people are becoming more alive to their true interest, and the day is not far distant when our citizens of the old school will fall in with the improvements of the age in which they live; even now the prospect brightens—the spirit of inquiry is abroad in the land, and men will profit thereby. There is at present some fine orchards of apples, peaches, and cherries in our county, and (thanks to a kind Providence for so good a climate) we have even under the present mode of culture plenty of fruit for home consumption; and as the people become fully aware of their true interest in this particular branch of husbandry, we shall have vast amounts of fine fruits for exportation to more sterile regions.

As there are still large quantities of vacant government lands in our county, and we are desirous of having its resources developed as speedily as possible, we invite the emigrant from the East and from the West, from the North and from the South, to come and settle among us, and help us to develop the resources of the country. The Atlantic and Pacific railroad (old survey) runs twenty miles north of us; it has reserved for its use and selection every *odd* section of land in our county, which is quite a drawback upon the settlement of the county, which I hope and trust appropriate legislation will correct before this letter comes to light. On our west the projected (*and sure to be built*) Leavenworth, Lawrence, and Galveston railroad finds its way down the valley of the Grand river; it will be distant only thirty miles.

Here allow me one word, somewhat irrelevant, yet of absorbing State interest: From some cause St. Louis has opposed our Southwest Pacific railroad. She has, through her prominent men, denied, but illy concealed, her evident opposition. She does not intend to continue this opposition much further, now that the main Pacific has reached Leavenworth and beyond, but she will likely mistake herself in her zeal to aid huge corporations to whom she has issued her city bonds, and she may wake up some fine morning to find this whole country tapped and made tributary to her powerful lake shore rival—the energetic city of Chicago—via the Galveston road.

We have excellent range here. The advantages of small farms, not crowded for an outlet as to range, etc., are not fully appreciated by our people. The crowded denizens of New England, and of the more populous Western States, need only to have the fact suggested to them to appreciate it. Stock of all kinds is easily raised, and is generally free from disease. The importation of Texas stock has at times introduced disease among our cattle, but we have no evidence of epidemic or endemic disease affecting stock of any kind.

Horses, mules, and sheep (the latter especially) are profitably and cheaply raised and cared for. Hogs do well with but little attention.

What we want is finer stock. The climate, range, and mast are all so favorable to cheap and profitable stock raising that it is absolutely astonishing that the best varieties are not introduced and propagated to a greater extent than they are.

Finally, the extreme southwestern county in this great State of Missouri invites the capitalist, the farmer, the mechanic, the vine grower, and the lover of fine fruits, to come and settle among us. It will pay; but to the admirer of nature in her loftiest moods we have something more. The finest scenery in the Southwest greets the traveler and the resident here, to relieve the tedious monotony of every day life. Bold cliffs crowned with cedar and pines, valleys grandly beautiful when viewed from an elevated point, exhibiting the cultivated farms, the meandering streams, the gushing springs, and the roaring cascades, all blending in one grand panorama—a perpetual evidence of the eternal sublimity of nature and of nature's God.

NEWTON COUNTY.—J. MORRIS TURNER.

DR. L. D. MORSE—*Sir:* Yours of October 23d, stating you had never been able to obtain a report of our county, was received a short time since. From a hasty review of the reports of other counties, as published by you, I infer that a circular with stated questions has been furnished them, to direct and concentrate attention and inquiry, promote uniformity, conciseness, and comprehensiveness, thereby greatly facilitating and lessening the labors of a report, while it insures a much better one. No such circular has been furnished this county; still, that our county may no longer remain unrepresented as it has been heretofore by those whose mistaken interest induced them rather to avoid emigration, I have endeavored to give an outline of some of the prominent features of our county, hoping that, with better facilities and leisure, some one more competent may hereafter do our county justice and fully meet your desire for a complete report.

Location.—This county is situated on the southwestern slope and at the foot of the highlands commonly denominated the Ozark mountains, washed by streams flowing to the southwest, which, just beyond the western border, empty into the Neosho river; this river again flows to the southeast and south. West of the north half of the county is the neutral lands, two years ago occupied by the Indians; now alive with thrifty farms, towns, mills, and factories. On the south is McDonald county, joining the Arkansas line.

Surface.—The surface is gently rolling. The bottom lands bordering the streams are bounded by bluffs more or less abrupt, which mold together as they run back, forming undulating valley and upland, woodland, and prairie. These bluffs are almost exclusively woodlands, while the bottoms, valleys, and uplands are about equally divided between timber and prairie. About three-eighths of the entire surface is prairie.

Soil.—The bottom lands for depth and fertility are equal to any in the United States, while their singular exemption from overflow and standing water renders them superior for health and cultivation. The soil of the uplands is about equally divided between what is familiarly termed here red, mulatto, black, and gray, according to the color on the surface; each color and quality having its favorites.

Timber.—Timber is abundant and cheap, comprising almost every species known to this latitude—except, it may be, poplar, beech, and shell-bark hickory; white, black, burr, post, pin, and blackjack oak prevailing.

Water.—Water is superior and abundant. Bold and lasting springs are frequent, both in bottom, valley, and upland. Over a dozen streams, both large and small ones, course through our county, bright, rapid, and strong. Supplied during the summer and fall by springs, they never lose their force, while the rains of winter and spring are carried off in their rapid current, only once in many years throwing them out of their low banks.

Stone.—Lime and sandstone of most exalting quality are abundant, easy of access, and easily worked. Home-made grindstones are not unfrequent and of fair quality. A certain kind of rock abounds in the western part of the county: white as chalk, and almost light as wood, it is cut in shape by hatchet or handsaw, and has furnished the farmers of the neighborhood a beautiful and lasting material for chimneys.

Coal.—Stonecoal has been found in several parts of our county; but owing to the abundance and cheapness of wood has never been developed.

Iron.—Iron ore has been discovered, but developed only for the small supply used in assisting to smelt the slag at the lead furnaces.

Lead.—Lead has been discovered in almost every section of the county. Several mines have been extensively worked, and several smelting furnaces built and operated. All of them, however, were broken up or destroyed during the rebellion. As the mines and furnace at Granby were heretofore the largest and most successfully worked—yielding about 1500 pigs of lead per week—so now, they are the first to recuperate and assert their pre-eminence. For richness of ore, quantity and quality of lead produced, the mineral of this county has no superior.

Products.—All vegetables known to this latitude grow abundant and luxuriantly. Irish potatoes may not yield so abundant as in Iowa and Northern Illinois, while sweet potatoes are much finer in quality, more abundant, and certain. Small grain of all kinds—wheat, oats, rye, barley, buckwheat, etc.—is considered a sure crop on all kinds of soil. Fall wheat only is raised, producing from 12 to 30 bushels per acre, according to season, time, and manner of sowing. With good culture it will average 25 bushels per acre; other small grain about the same, or a little higher in average, except oats, buckwheat, and barley, which yield nearly double. Wheat is generally sown about the 1st of September. Many, however, are still sowing, and expect a fair crop. Spring sowing is done in February and March. Corn is grown must successfully on the bottoms, next the valleys, then the red, the mulatto, the black, and gray lands. The average yield is from 60 to 30 bushels per acre. Many contend that a thorough system of cultivation, deep tilling and subsoiling, will make the clay lands equal to the best lands for corn, and be more lasting than the lighter soils.

Tobacco.—Tobacco is universally raised for home consumption. It is of most excellent quality, and yields very large.

Cotton.—Cotton, also, is raised by all who weave and spin. This year it boled out finely, yielding three pickings; ordinarily one and two pickings is all that can be relied upon.

Hemp.—Hemp may be seen in the fence corners, growing from 8 to 12 feet high. I have not learned of its being raised here as a crop.

Grass.—The prairie grass grows rich and luxuriant. This year it yielded from one to two tons of good hay to the acre on the uplands. There are but four timothy meadows; these yield well. I have seen red clover growing by the road side a foot high, but know of none cultivated. Blue grass has covered the prairies in some parts of the county. It grows rich and strong, promising the finest of pastures as the lands are inclosed.

Fruits.—Fruit of almost every kind yields a certain and abundant crop. Apples are superior in quantity and quality, and never fail of a crop. Peaches, so long as the trees are cared for and properly renewed, yield an unfailing supply of fine quality. I find only one or two kinds of pears in successful bearing here. The Morillo cherry is the only one successfully grown as yet; this yields a regular and abundant supply. I find no cultivated plum trees in the county. Wild plums yielded an abundant and fine crop this year. There are no cultivated grape vines of bearing age, to my knowledge, in the county; but of the adaptation of our climate and soil to the cultivation of the grape, every bottom and upland abundantly testifies with its yearly display of the largest and most perfectly developed wild grapes—white, pink, and purple—in size of bush and berry equal to the best cultivated sorts.

Hedges.—The Osage orange, or *bois d'arc*, seems a native here. It matures its fruit and seed so as to reproduce. The bush is seen frequently by the road side. Some hedges seem to have been set out in former times, but are neglected, growing rank and open. When burned by the prairie fires and cut down, they sprout up stronger from the roots. The cheapness of timber seems to have obviated this necessity and the care and attention necessary to their successful cultivation; but with the denser population now close at hand, their cultivation will be entered into largely.

Prices.—Timber lands range from $1 25 to $10 00 per acre; agricultural from $4 00 to $15 00, according to location, quality, and improvement. Sawed oak lumber is selling at the mills here for $1 50 and $2 50 per hundred feet. Pine lumber is selling in McDonald (the adjoining county south) for $2 00 and $2 75 per hundred feet. Wheat $1 50 per bushel, and corn 50 cents. Pork 8c., and beef 3½ to 6c. per pound. Provisions change rapidly in price according to supply and demand. Ours is entirely a home market of the miner, manufacturer, townsman, and emigrant, except for stock, which can be driven off.

Stock—This county seems especially adapted to stock raising of all kinds, with its mild winters, late falls, and early springs. Those of experience in this and other localities assert that 50 per cent. more of stock can be raised on the same number of acres here than can be raised anywhere East and South. The rich wild grass of prairie and timber furnishes both food and shelter to all growing kind, while the abundant mast materially assists in raising pork.

Manufacturing.—The water power in this county is certainly very superior. Grand Falls, on Shoal creek, has a perpendicular fall of over twelve and a-half feet, with rock-bound banks above and below. The volume of water is about one hundred feet wide by twelve feet deep. Two miles above Grand Falls is what are called the Shoals, where Shoal creek falls some eight or nine feet in near fifty yards. It is universally asserted that a good water power can be had on every mile of Shoal creek, which runs through the center of the county, from east to west, a distance of forty miles. Five or six water-power flouring mills have been repaired and rebuilt since the war, and are now in successful operation (before the rebellion there were over a dozen). There are now in operatien, in addition, one steam saw and flouring mill, two steam saw mills, one water-power saw and grist mill, and one woolen factory in process of construction.

Railroads.—The people of our county are now deeply interested in the Southwest Pacific railroad, which was located through this county some ten years ago, and hope to secure from the Legislature this winter such action as will not only insure its speedy construction, but also put many thousand acres of land, held from market for this road, in such shape as to be immediately opened for settlement and improvement, thus benefiting both the county and railroad. It is estimated that the railroad lands in this county, agricultural and mineral, are worth over a million of dollars. This bonus to whatever company builds the railroad through our county, must secure its certain and speedy construction.

To the Immigrant.—Four-fifths of the citizens of our county are thoroughly loyal and radical in the fullest sense—friends to schools, churches, and railroads; devoted to progress, improvement, and development. They honor labor, and extend a hearty welcome to the honest, enterprising, and industrious who are looking for new homes in a rich and growing country rising from the ashes of rebellion, whose motto is—Forward!

PIKE COUNTY.—W. C. DOWNING.

DR. L. D. MORSE—*Sir:* I voluntarily take upon myself the responsibility to report to you from this county. I believe that you have received no report as yet from this, the fifth or sixth county of the State in population and wealth. In taking upon myself this responsibility, I must be permitted to say that much that is necessary to make this communication what it ought to be, coming from one of the oldest, as well as largest counties in our State, is not now in my profession. Many points of information, very desirable, are not now at hand. Therefore I shall be excused for not making this report as interesting and full as desirable.

The Mississippi river washes the eastern boundary of this county its entire length—thirty-five or forty miles. Salt river clips a piece of the northeast corner, running within the county some fifteen miles. There are numerous small streams interspersing the county, being tributaries of Salt river and Cuivre. The eastern slope to the Mississippi has numerous streams at short distances, running into that great river, making abundance of water for stock in the driest weather. Water for family use is mostly obtained from springs and cisterns; cisterns exclusively on prairie lands.

The soil of this county is diversified—low and flat on the Mississippi and Salt river, but exceedingly rich, and much of it subject to inundations from the rivers. The eastern slope is undulating, with the exception named. The bottoms of the creeks are very rich, and much of the ridge land near the river is equal to any lands in the State. Those ridges, as they approach the prairie—the most elevated land in the county—become oaky, and are the best tobacco land we have. This slope of twelve to fifteen miles in width constitutes one of the best grain-growing regions of the State. A narrow strip of prairie land runs centrally from the south of this county to Bowling Green, then enlarges west to the border of the county. Nearly all these lands are now in a high state of cultivation. The whole balance of the county is timbered land, varying from the very best to medium in quality—much of it the very best for tobacco, clover, and wheat. There are no government lands in this county. Prices of improved farms range from $12 50 to $150, as in location, quality, and improvements. Wild lands suitable for improvements range from $10 to $75 per acre, as in quality and location. Lands are mostly owned by actual settlers. The most abundant timber is white oak, black oak, red oak, and hickory, with black and white walnut, burr oak, honey locust, sugartree, maple, cottonwood, sycamore, cherrytree, hackberry, pecan, mulberry, coffee nut, persimmon, dogwood, buckeye, willow, sassafras, serviceberry, and birch. Of native fruits we have crab apple, wild plum, cherry, mulberry, persimmons, serviceberry, black and red haws, blackberry, dewberry, gooseberry, and strawberry. Of vines and shrubs we have summer grapes, fall grapes, and winter grapes; bitter sweet, greenbrier, yellow parilla, hazlenut and prickley ash.

The county is abundantly timbered, and distributed so as to be convenient to our prairies.

We have an ample supply of lime rock. We have one of the best quarries near the county seat, Bowling Green, for building purposes in the West. Rock is easily obtained of any dimensions. I have seen rock one foot thick, eighteen inches wide, and from three to eighteen feet long, gray color, impervious to freezing, and susceptible of the finest polish. We have coal, but not found in great abundance yet.

There are three flouring mills in Louisiana. Messrs. Rules' mill has capacity to make three hundred barrels of flour in twenty-four hours. There are two others at Clarksville, of good capacity. There is one at Ashley, one at Frankford, and some others dispersed over the county.

There are several saw mills of large capacity in the county.

Thompson & Co., at Frankford, have a woolen factory of large capacity, worth about thirty thousand dollars. They run three hundred spindles, five or six looms, and make an excellent article of cloth—affording a home market for the clip of the county. They intend to still enlarge. Their machinery is adapted to the finest merino wool. They make an excellent article of cloth.

Our farm implements are numerous. Their success frequently depends upon the mechanical genius of the party using them.

Wagons and buggies of fine quality are made at different places in this county.

Breaking and turning plows are made in this county. Hardin & Co. are making a gang plow, thought by many farmers to be an excellent implement.

Corn is the leading crop of this county, as it is of the whole West. When corn is abundant we have fat hogs, fat beef, fine, healthy, and fat work animals, and an excellent bread for man. It is calamitous not to have plenty of this cereal. Deep and thorough cultivation is essential to success in the raising of this crop. Farmers are generally at fault in this regard. Subsoiling is essential in the cultivation of this crop. In grass lands, native or tame, my plan is to run after the sod plow a deep mold-turning plow, as deep as a pair of animals can pull it, covering up the sod from four to six inches, then roll and plant. Cultivate so as not to disturb the sod. The water, if the season is wet, sinks below the sod, and thus the plants are saved from injury. If the season be dry the decomposing process in the sod retains the moisture, and thus the plants are preserved from the drouth. Success with this mode of cultivation I have found to be absolute and certain. It is precisely adapted to our prairie soil, and I desire the farmers of our State to test this mode of cultivation.

The average of the corn crop of this county does not exceed thirty bushels per acre of a good season; it ought to average sixty bushels per acre. The best lands we have yield from sixty to one hundred bushels per acre in a favorable season, with good culture. This great crop is usually marketed with us in mules, hogs, and beef cattle.

Wheat is our next most valuable crop. The timber land of this county is peculiarly adapted to this grain. The berry grows plump and solid, from which our millers make the best class of flour, selling at the highest price even in New York city. It is extensively cultivated by our farmers, and the crop is of immense value. Our farmers have not been so successful on our prairie soil, arising from a lack of adaptation or a lack of knowing how to cultivate it. I feel thoroughly persuaded in my own mind that the best, and the very best, mode of cultivating this valuable cereal on our prairie soil is to second fallow—first early, second just before sowing, which ought to be done about the fifteenth September. Both plowings should be shallow—say two and a half inches—harrow and roll till the soil is clear of clods, then use the drill, depositing the grain on the unbroken soil, that the roots may adhere to the solid or unbroken soil, and thus be saved from spewing out by the freezing of the winter. This mode promises, in my estimation, the best success in wheat culture on the prairies of North Missouri.

Rye is not much cultivated with us, but succeeds well when care is taken in its management.

Oats is not a certain crop unless sown in March. The yield is about thirty bushels per acre; sometimes forty bushels are obtained.

Sweet potatoes do well—yielding from eighty to one hundred bushels to the acre.

Irish potatoes would do well but for bugs. They destroy a vast number of the vines and prevent crops.

Tobacco is cultivated quite extensively. A fair average is about 1000 pounds per acre.

There are several manufacturing establishments, affording employment to quite a number of hands, probably about two hundred. I do not know how much has been inspected; have no data.

Since the war there have been two fairs at Ashley. The grounds are well improved, and the fair of this year is claimed as being quite a success.

There is a horticultural society organized in Louisiana, the object being more for information than for the exhibition of fruits; although fine specimens have been on exhibition. Much more attention is now devoted to this subject than formerly.

Considerable attention is being paid to sheep husbandry now that machinery is being erected adapted to the manufacture cf fine wool; fine-wooled sheep as a consequence are in more demand. There are some of the best merinos in small flocks among us. The tendency is in the direction of the best merinos, this wool commanding the best price.

The lands of this county are finely adapted to the grasses, and much attention is given to grass culture. Timothy, redtop, clover, and blue grass are all held in high estimation; all cultivated with profit.

The Osage orange is rapidly coming into use for hedge making, there being no longer any doubt in reference to its utility or practicability.

Hogs are reared quite extensively. They are mostly marketed in St. Louis. Much attention is given to cattle raising. Durhams are quite plenty in herds. Almost every farm shows some of them. Some are fed and drove to St. Louis. Many are sold to Illinoisans to feed there—they then mostly find an eastern market. Quite an amount of attention is given to rearing the best and finest horses. Many of our horses are quite fine, and are as a consequence of much value. Mules are also raised in great abundance, forming the base for quite a trade. Our best mules are from mares of the finest class by large, well-formed thoroughbred jacks, of which we have quite a number; parties constantly importing and raising the very best.

In regard to the raising of fruit, I would say that, in a condensed report like this, justice cannot be done to a subject of so much importance to the people of this part of our State, where the apple, peach, and grape are grown in such perfection. It is not saying much to say that this entire county might be made one entire fruit garden, so well is our soil and climate adapted to their culture, growing and thriving in every locality in which they have been tried; and almost every farm in the county has its orchard. Hundreds of our farmers are making fruit growing their leading interest, having from ten to sixty acres set to apple trees, yielding them annually from $500 to $5000. Lands near the river are most in request for orchards, owing to the heavy carriage of the fruit. Fruit growing constitutes now about the third interest of farm culture in this county, and is soon destined to become the second if not the leading interest of the farm in all that portion of land lying near the river.

Grape culture is attracting considerable attention. Vineyards are starting in many different localities in the county, with every promise of success. A Mr. Cling, of Louisiana, has three acres in vines, four to eight years old, mostly Catawba, from which he is manufacturing a considerable amount of excellent wine. He claims the Catawba to be the best grape for wine, owing to its ripening neither too early nor too late. The Concord, in his estimation, ripens too early for wine making.

PULASKI COUNTY.—F. BREWER.

DR. L. D. MORSE—*Dear Sir:* In the absence of some suitable person I herewith send you a report from Pulaski county, collected from the most reliable sources and from actual observation.

The general surface of this county is hilly, stony, and quite unfit for general agricultural purposes, but admirably adapted to almost every variety of fruit raised in this latitude, pasturage, and especially the raising of sheep.

The Gasconade river and creek bottoms are very fertile, and are, as a general thing, nearly the only land that has been brought into cultivation. The county is amply supplied with the best of water, principally hard, which is supplied from never-failing springs, many of immense size, affording excellent water power for manufacturing purposes, few of which have been improved.

The upland is covered with a scrubby growth of post, black, and white oak, blackjack, etc., which is better adapted for fuel than other purposes, though most of it is suited for making rails, and much could be manufactured into lumber. The bottoms are heavily timbered with valuable and inexhaustible quantities of oak, several species of hickory, black and white walnut, locust, linden, ash, elm, sycamore, etc., much of which is of huge dimensions.

Wild grapes, red and black haws, pawpaws, persimmons, blackberries, raspberries, crabapples, etc., are the principal wild fruits, and are usually abundant.

About 75,000 acres of land are owned by individuals, the remainder belonging to the government and Southwest Pacific railroad. Much of the land is owned by non-residents. Improved land can be had for about ten dollars per acre, on an average, while unimproved is held by the government and railroad at from $1 25 to $2 50, according to location, as respects the railroad—those held by the road not being covetable just at this time.

No coal yet discovered. Iron appears to be abundant. Lead is said to exist in large quantities, but for want of enterprise none is being sought or worked; doubtless it exists in abundance, as time will one of these days demonstrate to a more enterprising people than at present have control of our affairs. No first-class mills. No manufactories, and no good agricultural implements, or nearly none, in the county—not even plows. Indeed, there is the least possible attention given to any branch of industry, agriculture included. In this the people are at fault, not the country.

Wheat grows finely, but does not average, by the mode it is cultivated, above ten bushels to the acre, while the soil is capable of yielding thirty or forty bushels.

Corn is the principal crop, and is more generally used for bread than all other grains—in fact, exclusively so by a majority. The average yield per acre is probably about forty bushels, but a much higher yield can be made by proper cultivation.

Oats yield well, but are not extensively raised.

Potatoes grow to perfection, but are raised only for home consumption. The same with sorghum.

Sheep will one day find this to be one of the most genial counties in the State, as the three or four thousand here could to-day testify, notwithstanding the poor attention they receive. Nothing could pay better to-day than sheep raising in this section, and it cannot much longer meet with neglect. All that is needed is for some enterprising man to introduce the thing, and the very lands that are now deemed worthless will be the most profitable and desirable in the State.

Horses, cattle, and hogs are easily and profitably reared, but this is in keeping with all other branches of husbandry; there being, by assessment, up to September 1, 1867, but 1498 horses, valued at $67,470; 117 mules, valued at $5825; 4561 cattle, valued at $54,550; 11,354 hogs, valued at $17,082. Of sheep there were 3,851, valued at $6059.

Grasses not much raised, but more attention is being given this branch of industry.

All kinds of garden vegetables grow to perfection; and apples, peaches, pears, cherries, etc., are almost certain crops, and grow to the greatest perfection—are principally raised for home consumption. There being, so far as I can learn, no professional fruit growers, I contemplate going into the business myself, provided the Southwest Pacific railroad should start up again in the spring, or perhaps shall if it should not, as it evidently must be built in course of time. There are no vineyards in the county, and this is another pursuit I hope to investigate.

In conclusion, I will say that all that is necessary to make this one of the most pleasant and desirable counties in any country is the development of its natural resources, which will only require a revolution in the present routine of old fogyisms, and must be done by the enterprise of a new people or the distillation of a new spirit in the old or present set of inhabitants.

Hoping the foregoing will be of more value than no report at all, and assuring you that it is intended to be correct, I submit it for your disposal.

RIPLEY COUNTY.—P. W. SMELSER.

DR. L. D. MORSE—*Dear Sir:* In obedience to your request, which I am just in receipt of, I will now try to give you the agricultural report, etc., of this county, for this year.

Ripley county is situated on the south line of the State, adjoining Arkansas, east of Elevenpoints river, west and nearly south of Big Black river, with Currant river running nearly through its center, and Lafourche (commonly called "Forche") rising in the southwest portion of the county.

There is no prairie in this county. As a general thing this county presents an uneven and rolling surface, interspersed with bottoms and good bodies of land—some barrens, which are level.

Fine pine timber exists in nearly all the northern portion of the county, for lumbering purposes, etc., while the county abounds in oaks of all kinds, hickory, walnut, ash, hackberry, mulberry, sycamore, elm, and some sugar maple. The principal undergrowth is hazel, sumach, grape vine, redbud, pawpaw, sassafras, iron wood, hornbeam, etc., and an abundance of good range for all kinds of grazing stock, during the spring, summer, and autumn seasons; and but little attention, comparatively speaking, is paid to stock even during the winter season.

There are but few good grist mills in the county—in fact I know of but one good flouring mill, which is on Currant river, near Doniphan—and some two or three sawmills. No other machinery; but it is not for the lack of water power to propel mills and machinery that we have none, because in Currant river, Little Black, and Forche there are splendid sites, and power to move any machinery that could be wished for or needed, especially on the former stream. But Ripley county, like most of the southern counties of the State, suffered so terribly during the late war that she has a hard struggle to recover. There is quite a number of springs through the county; good water, and plenty of stock water.

There is a considerable amount of government land in this county (the exact number of acres I am unable to give), mostly of an inferior quality. Land is generally rated low here: first rate improved at from five to ten dollars per acre; wild or unimproved at from one to three dollars per acre; inferior in proportión.

We have no really fine stock of any kind here, but we have some mixtures, enough to know that it pays the best.

As to the mineral resources of this county, I can only say that there is an abundance of limestone, and appearances of iron, lead, zinc, etc.; also, indications of saltpeter.

Last spring opened about two weeks later than usual (about the 1st of April), and was unfavorable for both planting and vegetable growth all the spring season. Although sufficient rain fell during said season, the weather always cleared up so cold that nothing could grow or do well until the ground would be so dry again that it could not, and so on until about the last of June, when what rain did fall went in skirts or spots; and, what was more strange about it, the rain that fell all summer seemed to always visit the same localities, which caused some neighborhoods to suffer a great deal more from drouth than others, although all suffered considerably. It continued in this way until about the last of September, when general rains began falling again. Although the summer was very dry, yet there was not much intense heat or sultry, unpleasant weather, nor much thunder—generally fine weather and healthy. No killing frost this year until toward the last of October; we have a fine, pretty open fall.

The yield of crops of all kinds is comparatively small in quantity, but not inferior in quality, this year. The average yield of corn is not more than twenty bushels per acre, but is not light and chaffy, as might be supposed, but is hard, firm, and heavy, clear of any worm-eat or rot. In ordinary seasons corn will make an average yield of forty bushels per acre. Wheat was a pretty fair yield—about twenty bushels per acre—and of good quality. Oats, about thirty bushels per acre, and good quality. Irish and sweet potatoes were not more than fifty bushels per acre, but good in quality, whereas the yield ought to be two hundred bushels per acre. Everything else in the cereal and vegetable line about in the above proportions.

Fruits were not as abundant as usual, but of good quality, clear of rot, etc. Our fruits consist chiefly of apples, peaches, pears, plums, and cherries, which all do well. Grapes have never been cultivated here to an extent sufficient to know exactly what they would do, but I am satisfied, from the abundance of the wild grape and the perfection which it attains, that the tame or wine grape would do well here.

The grasses that we have grown here are timothy, Hungarian, and red-top, and they all grow and produce finely.

Cotton will yield from six hundred to one thousand pounds per acre, that is in the seed, and perhaps more if properly attended to.

Tobacco grows and turns off good, but how many pounds per acre it could be made to produce I am not prepared to say.

All cereals, grasses, fruits, vegetables, melons, etc., that farmers and stock raisers need, can be grown here to profit.

This is also a good stock-raising county; horses, mules, cattle, hogs, and sheep are not subject to the diseases peculiar to other climates.

The implements used by the farmers here chiefly consist of the plow, hoe, and harrow, made here by our home blacksmiths; for small grain, the scythe and cradle. It is not because we don't need the proper "tools," etc., nor wish for them, to carry on farming with, that we don't have them, but because opportunities, etc., do not offer. The farmers here, I believe, generally are speaking of making preparations to obtain such machinery and implements as are necessary for farmers to have.

There is no agricultural board or society in the county.

In conclusion, I will say that I have not had the time nor facilities to devote to this report which I wished for, but have made it merely from my own experience and observation; nevertheless, I present it with candor, believing it to be correct. Having been a resident of this county a little over twenty years, and engaged in farming and stock raising for a livelihood, as a matter of course I have given the subjects referred to some attention.

ST. CLAIR COUNTY.—John Whitaker.

This county is probably as well watered as any in the State. Through the center of the county, from west to east, flows the Osage river, which is navigable for boats to Osceola, the county seat of St. Clair, for about six months in each year. In the north part of the county is Grand river, which would afford sufficient water power to propel mills or manufactures of most any kind; while in the south part of the county is Sac river, an excellent mill stream and Meairbleau creek, a mill stream. Besides these are many creeks and springs, which afford an abundance of water for stock raising purposes. In this county are several springs noted for their medicinal properties. The sulphur springs near Monegan have been resorted to by many infirm persons from various parts of the country.

About one-third of the land in the county is untillable, the surface being covered with rock; but the rocky land produces luxuriant grass, affording inexhaustible pasturage. There are several thousand acres of alluvial bottom land. The remainder is beautiful undulating prairie. The soil of the upland is somewhat sandy, though fertile.

Timber.—Oak, white and black, red and post, walnut, white and black, ash, birch, elm, sycamore, maple, linn, cedar, hackberry, hickory, mulberry, plum, cherry, etc.

Lands.—There is a large quantity of government land in the county, generally valueless. Land is low in this county, but owing to the immigration, which is large, land is rapidly increasing in value. At present unimproved land sells for about five dollars per acre; improved for from eight to twelve. Much of the land in the county belongs to the Merchants' Bank, of St. Louis, and several thousand acres belong to non-resident speculators.

Minerals.—Lime and freestone, cotton rock, flint, coal, and specimens of lead have been prevalent. No mines are worked. Silver has recently been discovered in the south part of the county; two or three mines have been opened, and a company is now formed to work them. Experienced miners think the prospect flattering.

Mills.—There several grist and sawmills, but no factories.

Agricultural implements.—But a limited number of reaping, threshing and mowing machines are used. The usual farming implements are in use. Plows and wagons are manufactured in the county.

There is no agricultural society in the county.

Corn—Is the most valuable crop in the county. The average yield is about twenty five bushels per acre.

Wheat—Is raised to a considerable extent, and yields an average of about ten bushels per acre.

Oats—Excepting corn, is the most valuable crop of this county. The average yield is probably twenty bushels per acre. The upland is best for oats.

Rye, buckwheat, potatoes, cotton, tobacco, hemp, and flaxseed are among the agricultural products of the county.

Sorghum—Is extensively cultivated, and is growing in the favor of our farmers. This year a sufficient quantity of sorghum molasses has been manufactured for home consumption.

Grasses.—Hay and tame grass have not received very much attention. Timothy and red top are principally cultivated. The blue grass grows spontaneously in prairie and timber, wherever the ground has been pastured.

Fruit.—A great abundance of apples and peaches is produced annually. Apples never fail—peaches rarely. As yet but little attention has been given to the production of pears, plums, grapes, strawberries, and raspberries.

Stock.—Horses, cattle, mules, hogs, and sheep are all raised to perfection.

I cannot boast of the loyalty of St. Clair at the breaking out of the war, but at the close scarcely a rebel could be found in the county. During the war a vast amount of improvements were destroyed. The commercial little town of Osceola was burned. But the county has fully recovered its loss. The town of Osceola is rapidly rebuilding, and promises to soon be what it was before the war—one of the principal commercial towns in Southwest Missouri.

STE. GENEVIEVE COUNTY.—Alva Enlow.

In a former report for this county, not being well posted, I was in error as regards blooded stock. We had three, and now have several thoroughbred stallions and mares. We have short-horned Durhams, also Berkshire and Chester white hogs.

Iron and lead are abundant, and saltpeter and white sand in inexhaustible quantities.

Wheat and fruit should be our leading cultivated staples. If I have not been misinformed, Ste. Genevieve flour stood highest at the late industrial fair at Paris. Peaches have failed but once in forty years, and some tell me they had a fair crop even that year. Troth's early red sold at home this year at the rate of $520 per acre. The tree, with proper care, lives to a great age—in some instances thirty years.

Although our farmers are classed low on the list of progressors, yet, from the number of fruit trees, reapers and mowers, clover-hullers, and wheat drills annually sold in our county, the indications are that we are moving in the right direction.

STODDARD COUNTY.—Geo. H. Crumb.

Stoddard county is bounded on the north by Cape Girardeau and Bollinger counties, on the east by Scott and New Madrid, on the south by New Madrid and Dunklin, and on the west by Butler and Wayne counties, and is situated on the dividing ridge between the Whitewater and St. Francis rivers.

It may be classified, with reference to soil and surface, in three divisions: First, the hill land, which is a clay loam with a subsoil of red clay, rather broken, moderately easy of tillage, and well supplied with springs of soft water; second, the East Swamp, as it is called, or the swamp land drained by Castor and Whitewater rivers, a sandy loam, increasing in fertility from the base of the hills eastward to the county line, consisting of parallel low ridges and shallow sloughs running in an easterly direction, the sloughs being filled with water to a depth of six inches to two feet or more from the middle of January until some time in May of each year; third, the West Swamp, comprising the St. Francis, Mingo, and Lick creek bottoms, and west of the hills, varying much in quality of soil from blue or light clay, which predominates, to light sand ridges. The dry lands are there in larger bodies than in the East Swamp, and contain some prairies, covered most of the year with a heavy growth of grass. In the southern part of the county these swamps are separated by a broad ridge of light sand and clay loam, called the Rich Woods, very well adapted to cotton.

Our creeks are few, and mostly become very dry during the summer months.

Most of the county is still covered with the original forest, and the size and quantity of timber is a great discouragement to attempted improvement. Nearly every American variety of deciduous oak can be found within the limits of the county. The red, black, and white oak appear to grow more naturally on the hills, while the overcup, cow, Spanish, and willow oak can be found mostly in the low lands. The elm, hickory, black walnut, white walnut, sweet gum, black gum, maple, hackberry, and pecan are well distributed. The sandy sloughs are filled with cypress, and around many springs are groves of beech and holly.

Wild fruits grow in great variety. So great was the hickory mast this year that thousands of hogs fattened upon it; the oak mast, which is usually heavy, having proved almost a failure. The hickory nuts of the bottoms would compare favorably in size with the black walnuts of other districts.

But a few thousand acres of government land remain undisposed of in the county, and that mostly very broken.

There are over one hundred thousand acres of swamp land offered for sale by the county, at one dollar per acre, from which could be selected many fine tracts. Most of this swamp land can, by systematic drainage, be made available for tillage, and many small farms have been opened on the ridges already. Thousands of acres belong to the Cairo and Fulton Railroad Company, and have been mortgaged for their full value; thousands are held by speculators, thus retarding much the development of the county.

But little rock is found in the county, mostly limestone, with a few hills of iron ore, said to be of excellent quality.

Indications of lead are found in various places. Some rich galena has been dug up, and there are some signs of copper. Masses of bog iron ore are seen along the border of the East Swamp.

There are five steam grist mills in the county, four with sawmills attached; three grist mills running by water power, on Castor river; six cotton gins, and three carding machines.

As our only market, Cape Girardeau, is fifty miles from Bloomfield, corn does not pay for hauling, although producing thirty to seventy-five bushels per acre, and is only raised for home consumption

Cotton raising has been followed largely in the southern part of the county for some years.

The crop of castor beans is said to have proved most remunerative of any product this year.

Sorghum thrives well, but the inferior machinery—wooden mills and common cast-iron kettles—materially lessens the product and injures its quality.

Wheat has proved a profitable crop when the ground is thoroughly prepared, but too many still follow the practice of shallow plowing, or sowing in cornfields, to insure an average large yield.

Oats grow well here, if properly sown.

Tobacco of fair quality was exported before the war, but its cultivation has been nearly abandoned.

Although the soil is well suited to flax, hemp, barley, and hops, no attempts have been made for their cultivation on a large scale.

Irish potatoes usually run out in three or four years, but produce well from Northern seed; peachblows, neshannocks, and California reds being the favorites.

The yield of sweet potatoes is usually very large, especially in sandy land, and the same may be said of gouver peas; and had we convenient and ready transportation to market, they would constitute no small item of our exports.

Nearly all kinds of garden vegetables thrive well, and melons grow so plenty as to be used for feeding stock and making molasses.

One could hardly find a more suitable natural location for fruit growing than here. Peaches and pears succeed best, giving large crops annually, without attention; the former having been known to but twice since the settlement of the country. Apples are only second to them, requiring regular pruning. Plums, cherries, and small fruits generally have succeeded beyond expectation where protected from stock and weeds.

Not the least profitable of our articles of export is dried fruit.

Little attention has been given to the grape. Several varieties have been introduced, but there are no vineyards in the county. The greatest obstacle to success with grapes is the hard clay subsoil.

There are few meadows or cultivated pastures here, the range being less expensive.

I see no reason why fine dairy farms could not be opened at the base of the hills in the edge of the swamps—plenty of springs of cool, soft water, a soil adapted to all kinds of grasses, while still further from the hills lie the lands best suited for raising corn and esculent roots. What more is necessary, but a market?

Rail timber is plenty, and hedges not used.

The raising of stock for exportation is quite profitable, and some attention is given to the improvement of cattle and horses.

Sheep and hogs require little more than protection, the latter living mostly on the mast and roots.

The climate is here very mild, snow scarcely falling to the depth of four inches. The minimum temperature of last winter, 1866–67, was nine degrees above zero, F.

It is very desirable that a more economical system of farming be adopted here than is usually followed. Rotation of crops is almost unknown, and constant cultivation of corn has already caused many fields to be condemned as worn out, to which a little attention would have caused a constant increase in fertility after the top mold had disappeared. No soil shows more plainly than such the beneficial effects of manuring. Lime seems to improve such land.

Situated as we are, with a continuous swamp reaching from Cape Girardeau county to the Arkansas line, between us and the Mississippi, varying in width from one to five miles, filled with running water, and impassable two-thirds of the year, what wonder that the farmers become discouraged and only attempt to raise enough to satisfy the commonest wants of their families. The effect of the late war has been to weaken much the financial condition of the county.

We had thought that the Iron Mountain and Cairo and Fulton railroads would soon furnish us the lacking connection with the great markets, but as yet have realized nothing. Must we look outside of Missouri for aid? Let a few thousand dollars be judiciously expended, and then let the enterprising farmers of the older States come on with their fine stock and improved farming implements, and in a few years not many parts of our State could boast of finer agricultural districts than the county of Stoddard.

VERNON COUNTY.—N. M. HARDING.

DR. L. D. MORSE: On page 309 of the Agricultural Report for last year may be found a general description of this county, its size, topography, soils, minerals, springs, timbers, and general adaptability to husbandry in its mixed character. As the description is substantially correct, you are referred to it to refresh your information.

Lands are selling at low figures. The casualties and disorganizing influences of the war have made this a matter of course. Hundreds of estates have been thrown into market, with accumulated taxes thereon, while the buyers for actual occupation have been largely unproportionate, leaving the speculator's figure to prevail generally. Non-residents' lands vibrate from two to six dollars per acre; first-class improved farms from twelve to thirty.

The facilities for improvement have greatly improved; merchants have enlarged their stock, farming implements have been brought out, mills for sawing and grinding have increased in number and efficiency, looms and spinning-wheels have begun their bang and buzz right spiritedly again, sewing-machines are occasional, and cooking-stoves general; and affairs are making haste a little faster than slowly. *Festina lente* is rural in toto.

People begin to appreciate labor-saving implements. They will soon become general. Corn-planters and sulky plows are much admired. Right here I will remark that we need a more durable plow than any one now in vogue. Much of our soil is sandy—productive, nevertheless—and cuts away a thin board in a season or two. The demand is for thicker mold-board and extra points and shares. Who will meet it?

Immigration is rather slim. The small breadth planted and sown last year gave but a self supply, and prices for grain to new comers ranged high. Land titles had got wound up by forfeitures, wrong assessments, and tax sales—estates as yet without legal representatives, non-residents having no agencies here; these things greatly hindered immigration. But matters are getting clear now; grain plentiful; lands low. We look for many of our cousins soon, and for their benefit and for the benefit of us all I here throw in an extra paragraph.

It would be greatly to the interest of any new county not to buy too many different patents of machinery—say mowers, for instance. Merchants cannot afford to keep on hand extra pieces for so many machines. The idea explains itself. Shall we profit by it? "Aye!" and time, money, and success will be the result. This will apply to all implements where castings are used, and manufactured at a distance. The wise man will see to this.

Orchards were destroyed by the fires, generally during the war, but the few left have yielded this season the most perfect fruit I ever saw.

Our winter was very severe—snow and sleet two-thirds of the time; April, cold and dry; May and the first of June, cold and very wet; July, August, and September, very dry.

Corn planted in April, good; late planting, light; oats, heavy; potatoes, sorry. Wheat was taken by the grasshoppers in the fall. The patches left were fair. Considerable area has been sown this fall. We expect to compound with dodgers next year, on the "half-and-half" plan. Sorghum is grown pretty extensively; it is late in maturing, and is thought to be poor in sap.

Deep plowing and early planting are more necessary to success here than in any locality I have ever lived in. We may calculate on dry summers generally. We are far from the ocean; far from any lakes of extent; nothing to afford vapor; no mountains near to condense it when blown over our vast prairies; rain in summer must, therefore, be unfrequent. Early planting is our hope. It never fails us. A few years ago Judge Badger finished planting corn on the 22d of March. He made the only heavy corn in the neighborhood that season.

Many cattle died here in the early spring, of cold backs and empty bellies. It was indeed a cold spring. Farmers had to begin again, after the war, at the beginning. Their farms were small—crops small. This explains the mortality in cattle. There was, last fall, quite an influx of Indian calves, but the winter put them through nicely.

Pork will be plentiful. Hogs have multiplied largely. Ours are the "scrub," generally. Some Chesters are scattered around. I don't fancy them here. We are not inclined to pet much, and Chesters must be petted to do well. The "root, pig, or starve" idea is fashionable here. There is small hope for Chester, then.

Our sheep are the ordinary There was complaint of light fleeces this spring. There is much inquiry for improved breeds of sheep. Sheep yield to kine only here. They are second in estimation and profit.

We have not taken hold of mule raising much since the war. We have no capital to invest in mares.

Our cattle have not been affected by the "plague" this summer, no Indian droves having passed through. The explanation is worthy of serious attention. I will not discuss this question here. Suffice to say, that old and observant cattle raisers declare unqualifiedly that this "plague," or "Spanish fever," unfailingly follows in the wake of Texas droves in their passage through the county—that it is very fatal, and that cattle raising here can never be extensive while it so proves to be. Nothing could be of greater advantage to this section than for Texas and the Indian Territory to raise or breed our kind of cattle. We could then serve as a sort of relay, a half-way house, by buying their calves and grow them to beeves. This trade could but obtain in that event, but never can with their present kind of cattle. Experience is proof here. Many Texas calves were bought by gentlemen in this county last fall, but five-eighths died before grass in the spring. One brave bought a hundred at three dollars per head, and in May he had one live Indian beef left! Think of it, three hundred dollars for fifty pounds of blue cartilage, and that of doubtful tenure! Yet I must tell the whole truth. Extra care was taken of these pets. This was soon found to be necessary. Still they died.

The grasshoppers are yet quite numerous on our prairies. They are all about loose, and have not shown a disposition to congregate, and have consequently done but little damage.

I am glad to see that a liberal breadth has been set to timothy here this fall, for prairie hay is but a poor winterer for either horse or kine. It is "roughness," true; it is also dryness. It is to timothy what "hard-tack" is to muffin—horse and man in the comparison.

The political and social status of the county leans toward harmony and confidence. There is one thing noticeable here more pleasant to contemplate perhaps than anything yet mentioned. The people are alive to the beauties and benefits of education. It is said that thirty schools are active in the county; and I am told by the school superintendent that he is taking steps to get up a teachers' institute.

We have one small nursery in the county. The proprietor is a man of taste and energy. So it will soon stand thus: cider and apple-butter in Vernon; beer and Limburg where they are fancied.

Our county fair came off the first three days of October, and, all things considered, it was quite interesting. We are not yet prepared for a good general exhibition; we must again crawl ere we can bound. Our county is, you know, a politico-civil baby since the war; but manhood, or rather womanhood, is fast coming upon her bruised bones, and our fair may be considered the psoas muscle of her backbone in its significance. About $700 were distributed in premiums—four $25, twelve $15, eleven $10, six $8, with many $5 premiums were awarded. The stock exhibited was really good. We will walk up to taw next fall about fair time. Many have made up their minds on success. Is this not half victory?

This county compares well with the southwest counties of the State in respect to agricultural advantages; yet I do not consider it peculiarly adapted to general farming. Success depends rather too much upon contingencies. But as a stock-raising county, it cannot be excelled. My authority is Nature's own self.

WARREN COUNTY.—C. A. KUHL.

DR. L. D. MORSE, ESQ.—In answer to your circular of November 7, I transmit you the following report concerning Warren county:

Our lands are of three kinds—bottoms, ridges, and prairies. The bottom lands are along the Missouri river, and are very rich, often yielding enormous crops of corn and wheat. The ridges grow fine tobacco, while some of the best corn and wheat crops have been raised upon our prairies.

Our forests furnish an inexhaustible supply of timber, mostly oak, suitable for railroad ties and bridge timbers, which will some day be in great demand.

Our principal productions are wheat, corn, oats, rye, potatoes (all kinds), tobacco, fruit, and sorghum.

As a fruit country, Warren county cannot be surpassed in America, all kinds of fruit prospering and bearing enormous crops.

The population of Warren county is now about 9000, two-thirds of which is German.

Agricultural implements are sold very readily, and nearly every farmer has the latest styles of reapers, plows, etc. The Excelsior reaper and mower, manufactured at Akron, Ohio, is mostly in use.

There are two good grist and saw mills in the county, and about half a dozen *things*—relics of twenty years ago.

Sheep raising could be made very productive here, but very little attention has as yet been paid to this branch of industry.

Great interest is being taken in grape culture, which promises to become very profitable. The Concord and Virginia seedling are the favorites.

No county in the State can boast of a healthier location than ours. Sickness is almost unknown.

The county seat is Warrenton, located in the center of the county, and on the North Missouri railroad, only fifty-eight miles from St. Louis. We have here two mills, one college, orphan asylum, nine stores, one brewery, three blacksmiths, two wagonmakers, three hotels, and about one thousand inhabitants. Merchants and lawyers are here in abundance. What we most desire is men of capital to start manufactories; also mechanics and farmers.

Land may be bought for from five to fifty dollars per acre, according to quality and location. Very fair farms may be had for twenty dollars per acre.

Since writing the above an agricultural and mechanical association has been organized upon a solid basis. Mr. J. E. Yocum, the president is an Ohio farmer of marked intelligence and experience as an agriculturist. The society will be an ornament to the county.

WASHINGTON COUNTY—FIN. R. HANNA.

DR. L. D. MORSE, ESQ.—*Dear Sir:* I have the honor, as Secretary of the Washington County Agricultural and Mechanical Association, to report that our society was on the 13th of June, 1867, incorporated by the Washington county court according to law; that on the 6th of July we proceeded to elect a board of directors, and on the 20th of July we organized by adopting a constitution, and electing our permanent officers for the present year, as follows: J. B. Johnson, President; Frank Harris, Vice President; Fin. R. Hanna, Secretary; George B. Clark, Treasurer.

As we then decided to put our society on a permanent basis, and believing this could best be done by enlisting the greatest interest of the greatest number of the people while the association was yet really forming, we declared in favor of a fair this fall. With this idea uppermost, and that, too, with the determination of having it carried out, we applied to the county court for its favor, and was very graciously given the sum of one hundred and fifty dollars, when we would make out a sufficient sum to expend five hundred dollars in premiums. And I am most happy to report that most of our people, determined that Washington county should be no longer one of the dead counties of the State, contributed most generously of their means until we had our three hundred and fifty dollars, and more, donated for our first annual fair. We made this year as an experiment, and are gratified to be able to report that henceforth the agricultural society is established on a permanent foundation in this county. We experimented in this way, made up the whole amount to be distributed in premiums by subscription and selling membership tickets, charged no entry fee, and had our exhibition free of charge. We held our first fair October 24 and 25, using the courthouse for our fine art, floral, and domestic departments, and an open lot adjoining the town of Potosi for our stock, etc., department. Our show of stock consisted principally of horses, there being but few entries of cattle, sheep, or hogs. The display was very creditable to any county in the State, yet we expect by another year to make a much better display in all kinds of stock. Our fine art, floral, and domestic departments certainly did great credit to the ladies—they having here, as elsewhere, done their part nobly, and fitted up their particular departments in such grand style as to utterly astonish all beholders, and the common expression was, "The display is but little inferior to St. Louis."

I regret that, owing to our recent organization, I am unable to gather sufficiently accurate statements to make a complete report of the many advantages our county offers in soil and products. I will, however, state that our hills are rich in mineral wealth, lead being found in vast deposits in nearly every portion of the county. There are several companies engaged in extensive mining operations who are being well repaid for their labor. Some of the mining is strictly on the "under-ground" system, being beneath the surface over one hundred feet, thence by lateral drifts to the extent of one hundred or two hundred feet. We have also in connection with the mining operations some smelting furnaces, by which we are able to convert the rough mineral into the bar ready for shipment. The average amount of lead shipped from our county is about —— per week.

Another great source of revenue to this county is the immense trade in pine lumber. We have huge forests of heavy yellow pine timber covering our hills, and with some —— steam mills are able to ship to the outside world some —— feet of lumber per month.

Of the different agricultural products and the real agricultural advantages of the county I am, at present, unable to report to you, but hope that ere another year's report becomes due such statistics may be gathered in the various classes as to enable Washington county to compare favorably with her sister counties on your books and in your published report.

In relation to fruit, our climate and soil are said to be unsurpassed for its culture, and our farmers are beginning to turn their attention in that direction.

The same may be said in regard to the raising of the grape. A great variety of both fruit trees and grape vines have been obtained from eastern and western nurseries, and the prospect is that our orchards and vineyards will soon be able to compete with the most advanced of our adjoining counties.

Our lands are all taken up, about one-third being owned by non-residents. Improved lands are worth from $10 to $40 per acre; unimproved lands will average about $7 per acre, according to the lead prospect and timber upon it.

To recur again more immediately to the agricultural society. By the system of having issued diplomas and the readiness with which our people have requested them in preference to a cash premium, and rather desiring that the treasury of the society should have the full benefit of all finances it could command, we have sufficient means on hand, after paying all expenses, to insure the incoming board of directors ample means to begin their year with every prospect of financial success. And, as we already have nearly seventy-five members, and the people generally are anxious to become such, I think I may safely report the Washington County Agricultural and Mechanical Association a permanent institution, and a perfect success in every particular.

PROCEEDINGS

OF THE

MISSOURI HORTICULTURAL SOCIETY

AT ITS

NINTH ANNUAL MEETING,

HELD IN THE SUPREME COURT ROOM, ON THE 14TH JANUARY, 1868.

PROCEEDINGS.

The annual meeting of the Missouri State Horticultural Society was called to order by the President, H. T. Mudd, who invited the Rev. Charles Peabody to open the meeting by prayer; after which the President delivered his annual address.

ANNUAL ADDRESS.

From grateful hearts will grateful homage be given to Him whose watchful care and protection have been extended over us during the year that has passed, and who now permits us, in the enjoyment of life and health, surrounded by peace and blessed with plenty, to again assemble in annual convention of our society.

The year just passed, though remarkable for long continued and excessive rains through the spring and early summer, and for the drouth which immediately succeeded and extended almost into the winter, has still been one of moderate returns to the husbandman, and of more than ordinary variety, if not of quantity and quality, to the fruit growers. All varieties of fruits have produced fair crops, while some have been unusually abundant and of great excellence. The peach and the grape have produced such returns as to challenge the admiration and excite the wonder of the many eminent pomologists who assembled in our city at the meeting of the American Pomological Society in September last.

No branch of productive industry has received so greatly increased attention during the past few years as have the planting and growing of fruit trees, vines, and plants. Twenty-five or thirty years ago a few small nurseries of a few acres each, in the vicinity of New York, and a few here and there in Massachusetts, furnished all the trees and plants of improved varieties of fruits then planted in the United States. At this period around one inland city of the Empire State thousands of acres are devoted to this business. Nurseries, where improved and largely increased varieties are extensively promulgated, are now counted by the hundred in the States of the Mississippi Valley, some of them having their hundreds of acres in nursery stock. Then few if any societies were in successful operation specially designed to promote the cultivation and improve the varieties of fruits; now we have our National Pomological Society, almost every State has its State society, and in many of the counties or districts we find associations—pomological or horticultural—organized for that purpose, and all sustained with a vigor, a zeal and enthusiasm scarcely equaled in any other industrial pursuit.

The period is within the recollection of many of us when fruit, indifferent in quality and variety, was regarded as a luxury only to be indulged in by the wealthy or the prodigal. Now every intelligent family regards a constant and regular supply of fruits—embracing, in their proper season, all the various kinds successfully grown in our soil and climate—as articles of prime necessity, as tending to the prevention of disease, and consequently to the promotion of the health and happiness of our people.

Great as have been the improvements in the varieties grown, we think there is much left which may yet be accomplished; and if our efforts, individual and organized, shall be well directed and earnestly continued, I trust we may soon be able to herald still further progress in this direction. We have no apple possessing every reasonably desirable excellence of both tree and fruit, both large and small. So long as this may be said, we have an extended field for our operations, inviting our earnest attention. If the native wild grapes of our numerous hills should have the careful and intelligent observation of our fruit growers, I doubt not many very valuable varieties would be secured. Attention should be given to the production of new seedlings by hybridization and otherwise. The production or the discovery of a native grape of thrifty, hardy, and healthy habit of vine, as uniformly productive as the Concord, and in fruit equaling in excellence the claims made in behalf of some of the new candidates for our favor, and which would make a light wine of superior quality, would, commercially considered, be worth millions of dollars to the country. Nor is it at all clear that it would not be worth far more in a moral point of view, as tending more than all the Maine liquor laws that ever were or ever may be enacted to check the excessive use of the fiery and maddening whiskies, and of the more sluggish poisons compounded into the ales and beers so universally consumed by our people. It is believed by many who have given the temperance reformation careful and attentive consideration, that the universal production and use of pure light wines will be found to be the best—the safest regulator of the almost universal instinctive love of stimulating and exhilarating drinks—by banishing the distilled and malt liquors now resorted to in the absence of the more harmless, if not positively beneficial, pure, light native wines, which we can and ought to produce in great abundance. History declares with one accord that the crime of drunkenness in the vine-growing districts of the Old World is so rare as to form the exception. When our temperance reformers shall recognize this fact, and shall make a "change of base" accordingly, they will have brought their forces to bear in the proper direction. When they shall have induced our people to provide pure native wines in quantity and quality that all may be cheaply supplied, then will whisky, with all its adjuncts, be eschewed by the mass of the people, and then will the temperance reformation be accomplished, so far as human wisdom may triumph over what, if you please, you may term the weakness, the frailties of man.

Our constitution now only makes provision for annual membership. It is believed that it should be so amended as to provide for life membership by the payment of a certain sum of money, and also that it should be so changed as to provide for making honorary members. This should only be done by vote of the society, and should be conferred only on persons of eminent merit in horticulture or kindred sciences, or who may have rendered distinguished services to this society. To those amendments I invite your attention at this meeting.

It is also believed that we may extend the influence and usefulness of our associations by copying after our neighbors of Illinois and Ohio, by creating an *ad interim* committee, who shall be "watchmen on the towers of pomology and horticulture," annually making reports of their observations. I would invite your attention to this, and would suggest the propriety of creating one such committee for each of the grand natural divisions of our State—Northern and Southern Missouri; and the time should soon come when we ought to be able to have such committees in the four quarters of the State.

I would also invite your consideration of some plan by which the organization of county or district horticultural associations would be encouraged and promoted, and by which we could secure an annual report from such societies in relation to the progress and condition of horticultural enterprises and interests in their respective localities. This would be followed by the introduction into all such localities of our agricultural and horticultural reports and other publications tending to popular information which could hardly fail of extensive and useful effect.

Since our last meeting I have received the agricultural report for 1866, printed in 1867, which will be furnished to members on application at office of Dr. Morse, No. 14 South Fifth street, or at this room during this meeting.

Mr. Peabody moved that, there being several points of importance in the address, a committee of three be appointed to take it into consideration and report. Adopted.

The President appointed Messrs. Peabody, Allen, and Walker.

REPORT OF THE SECRETARY.

Mr. President and Members of the Missouri State Horticultural Society:

GENTLEMEN: Our annual assembly leads us to review the steps we have taken and the marks we have made during another year.

The early part of the season for planting was marked by continued wet, followed by a drouth that for continuity and severity had no parallel since 1845. The result has been a great deficiency in several of our crops, and serious injury to many of our trees and perennial plants. While this excessive drouth did much injury, we can record some good from it in the great perfection of ripeness to which the grape crop attained and the consequent high character which will mark the vintage of 1867.

The apple crop has been very deficient in quantity, and wormy and defective in quality, and generally of a character that will prevent them keeping as well as usual.

Without entering upon any detail we will merely notice the very flattering manner in which the meeting of the American Pomological Society was regarded by all the distant members, and hope that steps will be taken in good time for the representation of this society at its next assembling.

I beg to call attention to a subject that has been but too long overlooked for the well-being of the society—that of life membership.

At the first organization of this society five dollars was subscribed by one of the members—Eldridge Burden, of Lexington—which several of the members of that date held to be a life membership, but as no notice of the subject, or action on it, appears on the record, nothing could be done. Since then the subject has been frequently thought of, but the "war times" and other circumstances prevented its being brought up. Since our last meeting many of the former objections are removed. Funds are necessary to the successful prosecution of the work, and one individual at least has deposited ten dollars as a life membership fee, but as there was no existing law under which it could be accepted, I beg to suggest that a by-law be passed or our constitution be so amended as to allow of life membership, and certificates be printed and given to persons so contributing to the funds of the society.

Since our last meeting the department of agriculture has lost its chief, Isaac Newton, and Horace Capron has been appointed in his place.

We are pleased at being able to say that Mr. Capron has thus early taken steps to put himself in communication with individuals and societies, in order to gain their co-operation and understand their views in regard to the work of the department. And we feel constrained to suggest if it would not be the proper time and place for this society to take the position that it is due to the dignity of the culture of the soil; due to the position that it sustains in its relation to our national welfare, and essential to the practical working of the department, that its head be created a cabinet officer, and its maintenance provided for along with the other departments of the government. We defer entering into any argument on the subject, but hope it will meet with due attention from the society.

This report was referred to the same committee as the President's address.

The Treasurer presented the following report:

John H. Tice, Treasurer, in account with Missouri State Horticultural Society:

1867.	January 1—To cash on hand	$130 55
	To cash from 134 members, at $2 each	268 00
		$398 55

CONTRA.

1867.	January 13—By warrant to W. Muir	$100 00
	January 14—By warrant to H. T. Mudd	45 70
	January 14—By warrant to J. Quighly	10 00
	October 13—By warrant to N. J. Colman	164 42
1868.	January 1—Balance on hand	78 43
		$398 55

LIST OF MEMBERS FOR 1867.

A. S. Redfield,
B. Smith,
H. T. Mudd,
C. M. Saxton,
Jonathan Huggins,
Chas. Peabody,
J. M. Jordan,
John A. Pettingale,
Jas. S. Rollins,
Geo. M. Wood,
H. Claggett,
L. D. Votaw,
R. D. Alexander,
Dr. Baumgartell,
Alva Culver,
J. L. Tracy,
H. Paddleford,
V. Gerber,
Geo. Booth,
O. A. A. Gardner,
R. S. Eliot,
M. F. Simmons,
Felix F. Fine,
Richard Perry,
Wm. Harris,
L. D. Morse,
S. B. Kellogg,
Dr. R. Bircher,
E. R. Mason,
F. Exter,
T. O. Springer,
J. T. Walter,
R. Barron,
J. Shields,
C. Saunders,
B. F. Edwards,
T. R. Allen,
E. S. Hall,
C. W. Spalding,
Isaac Snedecker,
J. S. Platte,
B. W. Davis,
W. T. Essex,
Geo. Husman,
F. J. Langendorfer,
Henry Michel,
A. E. Trabue,
Jno. T. Coleman,
E. M. Avery,
Augustus Starr,
P. H. Eisenmeyer,
S. M. Bayless,
H. N. Miner,
Thos. Somerville,
C. Andrews,
Wm. Stark,
Oliver Quinett,
C. W. Mills,
J. P. Helfenstein,
A. A. Hilliard,
J. Turner,
O. H. P. Lear,
T. W. Guy,
H. H. Mudd,
Dr. J. Hartner,
John H. Chambers,
G. C. Swallow,
Stephen Partridge,
Jas. L. Bell,
Wm. Elliot Smith,
Wm. Lucas,
S. W. Forder,
Henry Barron,
D. W. Bryant,
H. W. Cook,
Jos. Degenhardt,
Wm. F. Stacey,
G. L. Ditch,
W. S. Jewett,
Isaac Cook,
Wm. F. Bowen,
G. W. Wasson,
J. J. Kelley,
John Henwood,
E. A. Riehl,
Clark Chatten,
Jas. H. Russell,
A. Kehr,
B. F. Long,
Raphael Bush,
W. C. Flagg,
D. L. Kingsbury,
Tom Walker,
Stephen D. Morgan,
Geo. Drew,
L. W. Lyon,
D. S. Hoard,
T. J. Albright,
J. Koenig,
N. C. Covington,
Fred. Buschman,
Jas. A. Bayless,
J. S. Mahan,
J. M. Pearson,
Nicholas Greins,
Chas. Klick,
Jacob Rommell,
Isidor Bush,
Geo. Crosby,
C. F. Willard,
Chas. Paffrath,
M. C. McLean,
W. T. Nelson,
J. H. Beal,
Freeman Barnum,
W. S. Dyer,
Wm. Muir,
J. W. Sutherland,
Wm. Groshon,
Wm. M. Pierce,
Geo. R. Robinson,
Horace Holton,
John Alt,
Geo. H. Gill,
Robert Douglass,
H. P. Milks,
Chas. Lewis,
Jacob Madenger,
Henry Householder,
Jas. Bissell,
Jas. G. Soulard,
Ferd. Pauls,
John L. Thomas,
John H. Lightner.

A committee was appointed, consisting of L. D. Morse, O. A. A. Gardner, and J. M. Jordan, to examine Treasurer's account and report.

The business committee reported—

Meet at 9½ A. M.; adjourn at 12 M.
Meet at 2 P. M.; adjourn at 5 P. M.
Meet at 7½ P. M.; adjourn at ——.

The President read a report from H. M. Voris, of St. Joseph:

* * * "Our people here are just now alive to the subject of fruit growing. I have never heard so much inquiry for fruit trees and vines. We have had a fine crop this year of almost every kind of fruit. Apples, pears, peaches, plums, and grapes have all done well this year, and almost every one who has land is now talking about setting out fruit. Our pear trees have blighted some this year, and it seems that no remedy has yet been discovered; still we believe that pears can be profitably grown here, and as fine ones as grow in any other part of the country; in fact, all kinds of fruit which are grown in this latitude seems to be at home in Northwest Missouri.

"I have never seen more perfect fruit than we have had here this season, including everything from a strawberry to a fine pear. * * There will be as many grapes planted the present season in this neighborhood as have been planted in five years before. * * * Our Horticultural Society here is flourishing and we think is doing great good in inducing an enthusiasm upon the subject of fruit growing."

The President also read a business letter from Wm. Stark, of Louisiana.

A letter was received by the Secretary, on reaching home after the meeting, from which we make extracts:

MANHATTAN, RILEY COUNTY, KANSAS.

* * * "I can say that, in reading the proceedings of every horticultural society in the United States that I could procure, none has given me more pleasure, and from none other have I gained as much practical knowledge, as yours. You are not aware of the immense benefit that results to the country by a perusal of your proceedings by people hundreds of miles distant from you. * * * I commenced in 1856 (when no white man lived between me and Utah) to test the grape and other small fruits. The difficulties encountered were enough to discourage any man. We could not get plants by mail—had no express; sometimes plants sent from the East would arrive in July and August, in a most *excellent* dry condition, which, added to my ignorance of the culture of the vine, was anything but encouraging. Out of 800 planted in 1860—known here as the "dry season"—I had two vines to survive, and are now living.

"I have obtained about 300 varieties by name, but have only about 200 distinct varieties, all of which are healthy in foliage; but the Isabella and three or four other varieties growing under unfavorable conditions, with enormous crops of green fruit; they showed a little rot in 1867, but still they ripened immense crops.

"The past year was one of continued wet, the like of which I have never seen. The "bottom" lands on the Big Blue river were overflowed so much that travel was suspended for five months in the spring and summer. * * * In regard to the Catawba, with me there could not be a more healthy grape. I have not seen a diseased grape on it since it commenced to bear in 1858 or 1859. The Delaware is healthy, and I doubt whether we have a much better grape. As I have said the Isabella had a few berries that rotted in 1867. Ives' seedling is only one year old with me, as it failed to grow for three seasons—one year was 1860. The Iona and Israella are only three years old, as the package sent the first year was lost and Dr. C. W. Grant requested me not to let them bear till their fourth year; but their foliage is as healthy as the "noble Concord," or any other grape.

Among the most healthy and heaviest bearers last year was a red, sweet, foxy grape, which I procured as "Blood's white." A number of Roger's hybrids promise far better than I at first expected, although I had great hope that they would do well."

A. M. BURNS.

REPORT OF COMMITTEE ON TREASURER'S ACCOUNTS.

Your committee has examined the Treasurer's report, and find that the vouchers correspond with the disbursements, and we believe the report to be correct.

L. D. MORSE,
O. A. A. GARDNER,
J. M. JORDAN.

Delegates presented their credentials from the State Horticultural Society, Indiana—E. Y. Teas and Wm. Patrick; North Missouri Horticultural Society—Joseph Peyton; Illinois State Horticultural Society; Alton Horticultural Society.

REPORT.

The committee to whom were referred the address of the President and report of the Secretary beg leave to submit the following report:

The general sentiments of the President's address referring to the prosperity of the past year in the realm of horticulture, especially in Missouri, and his suggestions in reference to the introduction of new varieties of the grape, by searching among the wild grapes of the State and by hybridization, are fully appreciated, and are worthy the attention of the society.

Further, the opinions expressed in reference to the promotion of temperance by the abundant production of pure wine, your committee believe meet the full assent of the members of the society.

In reference to the changes proposed in the constitution by both the President and the Secretary, your committee would recommend that the following words be added to article 11th: "or a member for life, by the payment, at one time, of ten dollars." Also, the addition to article 12th of these words, viz: "honorary life members may be elected in the same way."

In reference to the suggestion to appoint a committee in each section of Missouri, for collecting information on horticultural subjects and stimulating the activities of local societies in different parts of the State, your committee are of the opinion that this subject should receive careful attention from the society. They would therefore recommend the appointment of a special committee, who shall take this subject into careful consideration, and report such plans to the society as may to them seem wise and proper.

CHAS. PEABODY, *Chairman.*

Mr. Peabody moved to strike out the words, in article 15, "except the right to vote." Adopted.

Mr. Peabody moved to add to article 11th the words "or a member for life, by the payment, at one time, of ten dollars." Adopted.

Dr. Morse moved the appointment of an *ad interim* committee of five.

Mr. J. M. Jordan supported the appointment.

The President put the adoption of the report to vote; which was adopted.

The President appointed, as a committee to report on the *ad interim* committee, Messrs. Morse, Pearson, Claggett, Jordan, and Gardner.

The committee on collation of by-laws presented a verbal report and proof of by-laws, which was read, so as to have the recent amendments incorporated with it.

Prof. Swallow moved to add to article 13 the words "unless otherwise ordered by the society." Amendment adopted.

Dr. Morse moved to change the time of the annual meeting from the second Tuesday of January to the third Tuesday of November.

Dr. Claggett moved to amend by making it the second Tuesday of December. Both lost.

Mr. Pearson moved to add to article 5 the words "in the order of the several congressional districts, and report at each annual meeting concerning the condition of horticulture within their districts." Adopted.

Mr. Flagg said that at first it would be hard to get these reports, but in the course of time they would come easily, and be found of great value.

Mr. Peabody reported that the principal hotels, excluding the Southern, would reduce the daily rate to members, during their attendance, twenty-five per cent., on presentation of the certificate of the Secretary, and that the Missouri railroads would return members free, and the Chicago and St. Louis railway at one fifth fare, on the same certificates.

Prof. Swallow suggested that the society take some action in regard to agricultural and mechanical colleges.

Dr. Morse moved that a committee of three be appointed, of which the President shall be chairman, to consider the subject, and make a report to the present meeting. Adopted.

Committee—H. T. Mudd, Prof. Swallow, and Rev. C. Peabody.

Mr. J. M. Jordan moved that the special order of business, after the election of officers, be to consider the place of the next meeting. Adopted.

Volunteer essays having been called for, Mr. T. R. Allen was requested to read one.

Mr. T. R. Allen then read the following essay:

Mr. President and Gentlemen: From past experience, thinking it probable that I might be called upon to contribute something, in the hope of benefiting our society, I have given a few spare moments to a brief consideration of the

UTILITY OF HORTICULTURAL ASSOCIATION.

It is in the concentration of individual effort that most of the wonderful achievements of man are consummated. This is so patent to every reflecting and observing mind that no argument or illustration is necessary to prove it. If such were the case, however, how easy the task to produce them or to point them out. Nature herself, in all her multifarious forms, abounds in examples illustrating and enforcing this great truth. The vast oceans are composed of little drops of water—their shores of minute particles of sand—and so all the organic matter of the planet we inhabit. And while we cannot fail to recognize this great fact, we must not underestimate or fail to encourage individual effort as of the utmost importance. In this age of literature, of commerce, of science, and the arts, it might indeed seem superfluous to cite instances and examples illustrative of this idea. Hence, for the present, we give these general principles, and proceed to make a few practical remarks on the utility of horticultural association.

Then let us presuppose that each individual in pursuit of this noble science—marvel not that I use the term science, for such it is—at his particular location, and surrounded by what he may consider peculiar circumstances, has, with more or less diligence, been pursuing his chosen and favorite calling, and striving, it may be, against many untoward incidents and discouragements—and who has not had them? —now cheered by the flattering prospects of success in a particular branch; but anon these cheering prospects are blasted by the sudden appearance of a blight, mildew, or the ravages of a hitherto unrecognized insect enemy. He is at a loss for the true cause of his discomfiture. Inquiries arise in his mind: Is it in my soil, or the variety, the mode of pruning, or the peculiarities of the season?

Here is a problem that may require years of precious time in experiments—to say nothing of the anxious care, labor, and money lost. At this stage of affairs how grateful would be even an accidental meeting of a co-laborer, in the same pursuit, from a different field? How earnestly and fervently and unselfishly would each relate his experience to the other? How ready to learn from and to communicate instruction to each other? Am I addressing any horticulturist whose experience contradicts this view?

Then, if the simple accidental meeting of two horticulturists benefit each other by saving precious time lost in experiments on various things—in economizing labor and money—in eliciting a fellow-feeling, warming and cementing a friendly and unselfish social regard—how much more a well-appointed and regularly-organized association like this of ours?

THE SOCIAL ADVANTAGES OF ORGANIZATIONS LIKE THIS.

I should feel that I had omitted the most important point in my subject were I not to notice this aspect of the case. We meet here not only co-laborers in a noble avocation, but as brothers, to compare notes and experiences; to counsel, advise, and to learn each from the other, to the mutual advantage of all and (may I not add?) for the "rest of mankind." A low, sordid selfishness, to which we are all more or less naturally prone, cannot live here. This is no place for it. True, it may enter this hall of science, but it must enter in disguise; its presence will be harmless, for the moment it attempts to exert itself here, the brilliant light that emanates from fraternal fellowship penetrates its thin veil, and reveals it loathsome deformity. Here the finer feelings of our nature and the noblest faculties of the soul have free play, and we seem to live not for ourselves, but for each other, and for the race. Friends and brothers, a noble work lies before us. We have accomplished much, but much more remains to be done. Behold, in our front, the vast and mighty field spread out, awaiting toil for its development; let us be grateful to the Great Father of all our mercies for past success, take courage, and with increasing energy proceed with our labor.

In our progress, obstacles are to be met, discouragements will arise; but a combination of knowledge gained by experience, a concentration of effort, and a persistent energy and diligence will overcome many that now seem so formidable, if not, indeed, almost insurmountable.

We have now just entered the threshold of a new year's pleasurable toil; let each feel a brother's care, and each a brother's friendly aid afford.

Professor Swallow. I wish to convey one idea, namely: the benefit that each individual derives from taking the tools into his own hands and working with them himself. How different is the interest we take in a plant that we have raised ourselves compared with those we purchase. We plant the seed, attend the seedlings, graft and plant them with our own hands, and we feel a link uniting us to them different from what is induced by mere purchase, which insures more care, better culture, and a higher pleasure in the results.

There is something so different from the watching and directing the operations of another. There is a pleasure he can never feel unless he does the whole work with his own hands. Here is one of the great benefits of this society. We want to meet with the men who have done all this. I feel indescribably more interest in the rose I raise from seed, or improve by cultivation myself, than in the one I purchase, however high its reputation or how much it cost.

Mr. Murtfeldt showed the value of itinerancy, from the influence of the Illinois State Horticultural Society upon that State by adopting that course. There will be much interest and pleasure felt by visiting even the small "one-horse" towns. If I go to a neighbors on a visit, and talk about my flowers, he wants to know how I manage; this begets an interest in him, and he tries to raise some himself. If we visit these small towns in the State it will be much the same. I know of no one thing that will stimulate fruit culture throughout the State so much as this one thing.

We exhibit fruit there, and, while it may surprise some, we can show that the soil and climate of these very localities can produce as good, and even better, than these. I hope that this thing will be considered, and that delegates will take home the news that we are willing to go to their places. If the members are taken to the homes of their friends in these places they will awaken a powerful interest in behalf of such operations.

Mr. Jordan. One of the best protectives against parasites in the vegetable world is motion. This is the same with us here. We are apt to have parasites fasten on us—the hotels, for instance—and by moving about we will prevent this.

The Secretary observed that this idea of itinerancy was an original principle with the society. The first two meetings were held in Jefferson City, where at three and four dollars a day, with eight to ten in a room, board was obtained about as good as we get in St. Louis at one dollar a day. It was during the session of the Legislature. A special meeting was held at Hermann, and about six members attended outside of Hermann. The idea of itinerancy was the true one, and it is to be hoped we have progressed sufficiently to be able to carry it out.

Mr. Tice. I think we are in a different position in this State from Illinois. There the towns are much closer, and have better communication. Here, at present, we have to come from Northwest Missouri to St. Louis to get to Jefferson City, and *vice versa*. I doubt if we will have, all things considered, a better point at which to meet than this.

Adjourned.

TUESDAY EVENING.

The special order of the evening being called, the following essay upon the peach was read by W. C. Flagg, Esq.:

That benevolent fisherman, Izaak Walton, whose "Complete Angler" every fruit grower should read, as also engaged in a "contemplative man's recreation," quotes one Dr. Boteler as saying of the strawberry, that "doubtless God could have made a better berry, but doubtless God never did." This is all very well, as the doctor confined his assertion to the berry fruits and probably had never eaten an American grown Lagrange or Columbia; but to paraphrase old Izaak in turn, I think God never made a more wholesome, palatable fruit than the peach.

A native of oriental lands and of warmer climes, the peach supplements the homely thrift of the northern apple with something of the voluptuous beauty and tropical luxuriance of the south. The cheek of beauty cannot vie with the colors that dye its vernal bloom and deepen in the delicate tints of its ripening fruit. Its taste is nectar; its fragrance ambrosial.

The peach may in all its modern names be referred to the Latin which arose from its supposed Persian origin. Thus we have English, peach; German, pfirsche; Danish, fersken; Swedish, persia; Anglo Saxon, persuc; Provencal, presega; Spanish, persigo and prisco; Portugese, presego; Italian, pesca and persica; Latin, persicum (sc. malum), or Persian apple. Its southern origin and northern limitations are thus almost set forth even in its etymology.

Botanically, the peach belongs to the order rosaceæ, sub-order amygdaleæ, comprising the almost identical orders of the almond and peach, as well as the apricot, plum and cherry. It comprises but one species, *Persica vulgaris*, from which we have the following sorts, sub-species, or varieties, chiefly ornamental and of no practical value:

1. Persica vulgaris, flore pleno alba, or double white; 2. do. do., rosea, or double rose; 3. do. do., sanguinea, or double red; 4. do. do., camelliaeflora, or camellia flower; 5. do. do., corophylliflora, or carnation flower; 6. do. foliis variegatis, or variegated leaved; 7. do., pendula, or weeping; 8. do., compressa, flat peach of China; 9. do. lævis, or nectarine; 10. do., saligna, or willow-leaved of India. To these we might add: 11. do., aurea pygmaea, Van Buren dwarf; 12. do., Italian dwarf.

Most authorities follow the Roman nation, that the peach originated in the country whence the Romans received it; but this opinion is briefly refuted by Dr. Unger, who seems to regard its native country as more probably China or Japan. I give his remarks on the fruit at length: "It grows best in China or Japan. Its cultivation in China goes back to the furthest antiquity. The peach is the *tao* mentioned in the books of Confucius, in the tenth century before Christ. It is no longer found wild, although forms run wild are met with wherever the cultivation of the peach has been carried on for any time, especially in the Caucasian country, in Terek, Persia, Southern Himalaya, China, etc. The native land is, therefore, probably to the northeast rather than to the northwest of India, whence it extended first to

Cashmere and to Bucharia, and gradually to Persia, Asia Minor, *etc.* The absence of a Sanscrit name for this important fruit shows that its transplantation from its native land took place before the migration of the Sanscrits.

"At the time of Aristotle there were no juicy peaches raised in Greece as in Egypt. Even upon the Island of Rhodes (to which point this tree probably first came from Asia Minor), where it produced at that time only flowers and single-scattered fruit, it is probable that what might be considered as different species of peach are only varieties, which all arose in the course of cultivation."

The reference to Confucius is probably to the ninth chapter of the commentary of Thsing-Tsen on the "King," and consists of a quotation from the "Book of Verses"—

> "How beautiful and pleasant is the peach tree!
> How blooming and profuse is its foliage!
> Such is a young bride entering the abode of her spouse
> And properly demeaning herself toward the people of his household."

The peach is not mentioned in the Bible, but the almond is spoken of several times. This fact, coupled with the small esteem in which the fruit of the peach seems to have been held, even down to Pliny's time, leads one to suspect, what the passage from Confucius in a measure implies, that in the old time the almond and peach were much nearer being identical than now, and perhaps were so little different that the almond of the Bible and the peach of Confucius were regarded rather as ornamental trees than as of any economical value as fruit or nut producers. Against this opinion, however, is the enumeration of "almonds" with "nuts," among the presents which the patriarch Jacob instructed his sons to carry into Egypt to propitiate the not yet recognized Joseph.

The peach presents, so far as I can learn, the same curious state of facts as the apple: an existing cultivated species, if it may be called such, of which no wild type can be found, unless we take the almond as its original. Royle is the only author referred to as authority for its being found in a wild state in Persia and in different Himalayas. A much wider and well recognized range is assigned to the wild almond, embracing Northern Africa, the mountains of Asia, Russia, and the Levant.

Whencesoever it came, the peach tree has now gone out over all the earth. "The Romans," says Loudon, "received the peach from Persia during the reign of the Emperor Claudius. It is mentioned in the writings of Columella, and several sorts are described by Pliny. It was in cultivation in England about the middle of the sixteenth century, but in all probability was first introduced when the Romans had possession of the country. It is now in general cultivation as a fruit tree, against walls, in the middle and north of Europe; as a standard tree, in fields and gardens, in Italy, Spain, and the north of Africa, and in various countries of the East, including Persia, India, and China."

Among the localities more especially enumerated in his Cyclopedia of Agriculture are the Neapolitan territory of Austria, where the peach is grown as a standard in the fields as far north as Vienna; Russia, where the apricot, almond, and peach succeed as standards in Taurida, Caucasus, and other southern districts; Turkey, where peaches are of the first flavor; Persia, Arabia, Thibet, which country is reported to contain the peach both in a cultivated and wild state; Abyssinia and the Cape of Good Hope.

The patent office report for 1853 states that the peach was introduced into British North America soon after its settlement. "The stones were ordered by the governor and company of the Massachusetts bay, in New England, in 1629. Beverly mentions the peach in Virginia in 1720, and peach trees were killed by frost in the province of New York in 1737."

The writer adds: "The peach was introduced into Louisiana by the Spaniards, prior to its settlement by the French, where it has since grown spontaneously, and in many respects apparently indigenous." Du Gratz, however, in his history of Louisiana, the original French edition of which was published in 1758, says (I quote from the English translation of 1774): "The natives had doubtless got the peach trees and fig trees from the English colony of Carolina, before the French established themselves in Louisiana. The peaches are of the kind we call Alberges, are of the size of the fist, adhere to the stone, and contain so much water that they make a kind of wine of it. * * * Our colonists plant the peach stones about the end of February, and suffer the trees to grow exposed to all weathers. In the third year they will gather at least two hundred peaches, and double that number for six or seven years more, when the tree dies irrecoverably. As new trees are so easily produced, the loss of the old ones is not in the least regretted."

These statements account readily enough for the alleged existence of the peach tree on the Mississippi river in the startling accounts given by that Baron Munchausen of missionaries, Father Hennepin, without the supposition of their being indigenous, as McIntosh and others have conjectured. They are sustained by the fact that the only species of amygdalus that is noted as occurring in America is amygdalus microphylla, a "native of Mexico, on arid hills at the hight of 3900 feet. Flowers small pink; shrub three feet high."

I may add that, however introduced, the peach is now found in nearly all parts of the two American continents, from Canada to Paraguay, and seems hardly less at home in America than in Asia.

The classification of the peach has made more progress among us than that of the apple, and that of Lindley is, with a little modification, generally adopted, viz:

Class 1: serrate leaves without gland. Class 2: crenate leaves with globose glands. Class 3: crenate leaves with reniform glands. Division 1: with large flowers. Division 2: with small flowers. Subdivision 1: peaches. Subdivision 2: nectarines. Section 1: clings. Section 2: free.

A division according to exterior and interior color ought to be made and perfected, in order to arrive at still more practical conclusions. Thus we should have:

1: red peaches, as Troth's early. 2: yellow peaches, as Crawford's early. 3: white peaches, as Morris' white. 4: brown, as Columbia; but this is about identical with the yellow peaches.

Perhaps it would be convenient to have the following classification:

I. Peaches with white flesh. II. Peaches with yellow flesh. 1. Peaches white at the stone. 2. Peaches red at the stone.

The varieties of the peach are at least sufficiently numerous to be a good deal confounded. Parkinson, in 1629, enumerates twenty-one varieties; Miller, in 1750, thirty-one; Forsyth, in 1810, forty-one with descriptions, and thirty-three others—in all, seventy-four; Christ, in 1817, forty, including nectarines; Coxe, thirty-eight, while in the last catalogue of the American Pomological Society we find fifty-five, and in the last edition of Thomas' Fruit Culturist one hundred and forty-eight.

The varieties that come down to us from Coxe, and remain approved, are Oldmixon free, Grosse mignonne, Columbia, and Heath, besides others of doubtful identity.

Among the varieties approved in England I find the familiar names of late admirable, yellow Alberge, early York, George IV., Grosse mignonne, and noblesse.

Of the fifty-five varieties on the lists of the American Pomological Society for 1864 I find that, from the twenty-two districts noted, the Crawford's early received a unanimous vote, showing the great popularity that sometimes attends lack of merit. Oldmixon free more deservedly receives 20 votes; Crawford's late, 18; large early York, 17; George IV., 16; Morris' white, 16; Coolidge's favorite, 15; early York, 15; Heath's cling, 13; Grosse mignonne, 11. In all ten varieties receive half or more of the votes cast.

The following varieties are quoted by name in the Chicago Prices Current of 1867, and may therefore be put down as at least the best known varieties in that market, where to know the name of a peach at all is, at least, proof of its very extensive cultivation: Crawford's early, red rareripe, Oldmixon free, Crawford's late, and smock.

There is great confusion of varieties in the peach, owing, I suppose, partly to the fact that our best pomologists are generally north of the best peach regions, and have limited opportunities to study the fruit; and partly to the greater frequency with which the peach reproduces its kind from seed, whereby new varieties, only slightly varying from the old, are continually claiming our attention. I note a few of these confusions existing in our part of the country.

Haines' early, as Dr. Hull has it, is identical, practically, with Troth's early, as introduced by Mr. Townsend at Collinsville. Mr. Meeham notices the entire similarity in the Gardener's Monthly for 1861, page 314. Coles' early, as Mr. Huggins, George Booth, and myself have it, is about the same thing as Troth or Haines' early. Under whatever name it is a very desirable peach.

George IV is generally regarded as an early peach, ripening about with, and hardly distinguishable from, large early York. But as George Booth, Dr. Hull, and others have it, it is rather a late peach, ripening with Crawford's late.

The Honest John yellow, of lower Egypt, as I am informed by Mr. A. M. Lawver, of South Pass, who has one hundred and fifty varieties on trial, is probably identical with yellow rareripe, a variety in its turn much confounded, but which may be thoroughly identified by its ripening about with the early Crawford, having a very deep, rich color and red cheek, and round fruit with a suture. The Ohio Pomological Society, on the other hand, were inclined, in 1864, to regard the Honest John yellow as identical with yellow Alberge.

A problem much worked upon by our enthusiastic peach growers is that of a "peach list," the elements of which are to combine the fewest number of varieties of the hardy, healthy, handsome, good, large, and portable peaches ripening in the most extended succession in one list. I have collected a great many solutions, more or less satisfactory, but will only trouble you with two or three.

The first, taken from the report of the Commissioner of Agriculture for 1865, is that of Isaac Pullen, whose death last month took from us one of our oldest, most experienced, extensive, and, if I may credit general testimony, one of our most honest fruit growers. Mr. Pullen, giving the result of long experience, derived not only from nursery propagation, but orchard and orchard-house management, put down the following:

1. Hale's early; 2. Troth's early red; 3. Large early York; 4. Crawford's early; 5. Yellow rareripe; 6. Oldmixon's freestone; 7. Reeve's favorite; 8. Stump-the-world; 9. Crawford's late; 10. Ward's late free; 11. Smock; 12. Heath (cling).

All these varieties have been tried here, excepting, perhaps, Reeve's favorite, and that is highly commended in Lower Egypt.

A. M. Lawver, of South Pass, furnishes me the following:

1. Hale's early; 2. Troth's early red; 3. Large early York; 4. Yellow rareripe (ripening with and superior to Crawford's early); 5. Oldmixon free; 6. Stump-the-world; 7. Ward's late; 8. Smock.

Mr. Lawver wishes to add to this list a later ripening yellow peach, but has not yet fixed upon any which he can commend. He throws out the Crawford's early and late. These two varieties seem to be losing ground in Southern Illinois, and the lovers of good peaches will not regret it.

For a more extended list Mr. Lawver offers the following:

1. Hale's early; 2. Troth's early, Galbraith, Ried's golden yellow; 3. Large early York; 4. Crawford's early, yellow rareripe; 5. Old-

mixon, Reeve's favorite; 6. Crawford's late, stump-the-world, Ward's late, Harker's seedling, druid hill, Pullen's seedling, Fox's seedling, late rareripe, Switzerland; 7. smock, Allen's October; 8. (supposed) Osceola, Picquet's late, Freeman's smock.

My own experience and observation leads me to the following conclusions in making a selection of market varieties: The variety, with fewest objections, is probably oldmixon free. For a list of four that will nearly cover the season, and against which few or no objections can be urged, I would put down

1. Troth's early; 2. Large early York; 3. Oldmixon free; 4. Smock.

I conclude this branch of the subject by giving the dates of my first shipments of different varieties during the past season of 1867, with my impressions concerning each variety.

August 5.--Hale's early. Vigorous tree and good bearer of fruit, but very subject to rot. I find this to be its character at South Pass, at Alton, at St. Joseph's, in Michigan, and everywhere else that it is grown. It will pay to grow for the local market, because it has no formidable rival in earliness, but not to send north and sell in competition with the large early York and Crawford's early from further south.

August 10.—Early Tillotson. A good peach, but the tree is not healthy enough under a full crop.

August 12.—Troth's early. Not large but very handsome, free from defects and productive, standing second in productiveness in my orchard this year. Tree very good.

August 19.—Large early York. Tree very vigorous, fruit a little defective, but otherwise without fault. This variety stood third in productiveness. Same date came Crawford's early very badly thinned out by the frost of May 7th, and fruit uneven in size. Tree not very good.

August 21.—Red rareripe. This variety, which I suppose to be Morris' red rareripe, has a good tree, and stood fourth in productiveness. Quality rather better than large early York; fruit not so large. Same date came yellow rareripe. This was injured by frost more than the Crawford's early. The fruit was very handsome and nearly best in quality.

September 2.—Magnum bonum. This year the most productive peach I had. Quality only good. Same date Morris' white; fine peach, but hardly ever free from mildew of fruit.

September 5.—Aldeiman's free; not satisfactory.

September 6.—Late admirable lacks high color, but was large, productive and of very good or best quality.

September 11.—Columbia. Too much fruit; not properly trimmed, and the quality not good. In most years this has been the best peach with me. Same date came Crawford's late; badly injured by frost. Fruit very large and handsome, but very little of it.

September 18.—Delaware white. This may be Crocket's late white, and is a very satisfactory peach. Very productive. and carrying its fruit well into and beyond the season of the smock this year. Quality good.

September 25.—Smock. I have no fault to find in this peach except its quality.

September 30.—Heath cling. A first-rate peach, that is hard to sell merely because it is a cling.

I fruited two later varieties I have that lasted up to the middle of October. One was a serrate leaved white peach, which I find satisfactory in productiveness and flavor, though rather small and acid. One year it was touched by frost and presented a curious specimen of disorganized peach. The other was the October yellow, a variety originated in this State, and disseminated by J. C. Teas, of Indiana. This is a yellow peach not large the past year, and very good in quality. I mention them because inquiry should be turned in this direction. We need, can ripen, and, I am confident, can obtain, a freestone variety or two to succeed the smock as market fruits.

I need not say anything of the propagation of the peach; and it is, I believe, well understood that our peach orchards in this latitude should be planted on the highest eminences or ridges, both on account of frosts in cold weather and good ventilation in warm. It is well agreed, I think, too, that we should plough deep for peach trees, and all other fruits, and all other crops. Most are agreed that 20 feet apart is the distance, and, from a pretty extensive observation the past summer, I think this is correct, unless special pruning is resorted to.

One word, however, on pruning. I am more convinced the past year than ever that something like pyramidal pruning is best for the peach tree. In this warm climate it is not necessary to have a hollow head to admit the sun, and I find trees with leaders standing up to their work better, lasting longer without splitting down, and freer from diseases, both of tree and fruit.

On pruning the peach tree a word may be said. I regard Dr. Hull's method of shortening in by thinning out as the best yet devised, and find it commended by high authority. Thomas speaks of it under the name of thinning back.

Packing the fruit for market is an important subject of consideration. Our Southern Illinois growers are now nearly all shipping in boxes containing one-third of a bushel, made of two end and one middle heading, 5x8, on which are nailed, on the edges, lath or strips 4 inches wide by 22 long, and on the sides two strips, each 3¼ inches wide by 22 long, and these latter sizes are varied. The objection to this box is that the corners bruise the peaches, and that large peaches cannot be packed in it well. On this account our friend "Rural" and others are recommending a return to baskets, or something of that shape, made stiff, and with a wooden cover. In these peaches can be packed with less injury and more satisfactorily to grower and producer. Whether they can be made to endure the wear and tear of railroad transit remains to be seen.

Dr. Spalding. I would like some information on picking fruit.

Mr. Flagg. There is a basket that is much approved by many peach growers, made much like a firkin, with three hoops. They can be shipped by railway without damage. I sent some peaches to Chicago in them as an experiment, and they brought 25 cents more a basket. They hold one-third of a bushel. They are intended to be returned two or three times. The sides are tulip tree, and the covers and bottoms pine. They are made upon a "form" made by setting three discs of iron set upon a spindle. The inner and outer hoops are set in the top and a lath set in place, and this continued all round. Sometimes the staves are made with holes to let in air, as well as by the spaces between the staves. These baskets pack better particularly when the peaches are large than in the usual boxes. You cannot put two large peaches like this (exhibiting a good sized apple) into a third of a bushel box, so you have to put in large and small together, which is a bad way to market, and brings an inferior price.

Dr. Spalding. I would like to have the differences between large early York and George IV pointed out.

Mr. Peabody. In reference to Hale's early, I have 50 trees in bearing. They have rotted every year—two-thirds are lost; and Mr. Guy thinks of grubbing his up. The large early York rots. I notice when Hale's early rots it destroys the entire limb. The leaf next the peach rots; it then extends to the twigs and small limbs, and this is a fatal objection to the variety.

Mr. John H. Tice. This fact is not peculiar to Hale's early; it is much the same with all other varieties that rot. It begins in the fruit, and you will see the entire *fungus* under the microscope. Early in the season it does not produce "spores," but crumbles down. Late in the season the "spores" are visible, and it extends from the fruit to the leaf and twig, but it is in each case the same *fungus*.

Mr. W. C. Flagg. In Hale's early there is a strange contradiction. It is a leaf with globose glands, and a strong, vigorous tree, and the rot comes as badly as upon serrate leaved varieties. It has a smoother skin than most other varieties, and may thus be more liable to the attacks of insects. Then there may be something in the pulpy texture of the flesh; it is more watery than most other varieties.

Mr. Peabody. Has any one tried the sulphur on the trees?

Mr. Flagg. I have not, but will do so this year. They rotted worse in the rich low lands than in thin, dry, high lands.

The President. It seems a poor producer. I had four trees and did not get a dozen fruit.

Mr. Eliot. I am glad to hear this peach discussed. My Hale's early rotted badly, and I was afraid it was bad culture. Would not the society better condemn this peach?

Dr. Spalding. This is a very valuable crop and holds out strong inducements to get new seedlings. I find but few varieties that are perfect in tree and fruit. A variety with tree vigorous, dark color, globose glands, fine grain, firm, free, small pit, etc. There are but few varieties that combine all good qualities, and we must try and get these. Many varieties have one side larger than the other, and this shows, in the fruit, bad development. Then a regular round form, and not like some, oblong. Some have the one side better than the other, as the Lagrange. In good culture we can overcome these difficulties, but only to a small extent. We must originate varieties. Other fruits are being improved by hybridizing. With the peach there is a good chance of improvement. In this city there are some new seedlings that will be valuable and combine many excellences.

Mr. Peyton. I have not succeeded well with peaches. Planted 500 trees, and the season before last bought all my peaches. Would ask whether budding makes them tender. Not far from Hannibal there are 6000 trees and hardly any peaches. A neighbor budded half a tree; the seedling bore full and buds none. Can we not bud from our best seedlings?

Mr. Flagg. I would like to inquire if, where the seedlings are hardy, they do not always have large flowers? Most of our budded peaches have small flowers.

Dr. Spalding. There is nothing in vegetable physiology that shows budding makes a fruit tree tender. The energies of the tree in poor varieties go to make wood, in good varieties to make fruit. The large portion of seedlings are not transplanted. May there not be something in the taproot not being cut off? which is the case in transplanting.

Mr. Peyton's only fruit was on trees that came up in the places where they stand. Good fruit has large buds, and they are soft. The same with the small cherries.

Mr. Peabody. That brings out the point that we cannot get all the excellences combined in both tree and fruit. Perhaps in the budding, cutting off the top in spring, throwing all the vigor of the tree into one shoot, which makes a great vigorous growth of soft, spongy wood, has something to do with the hardiness of the tree. It might be well to try to make the growth less.

Mr. Riehl. The seedling is hardier because it is a seedling. I know an orchard that was planted in the bud. Many failed to grow, and when there was no fruit on the budded trees the seedlings were full. The seedling is hardier because it is not so highly developed.

Mr. Flagg. I think where the seedlings are hardy they have large flowers. The large petals may protect the germ.

Mr. Eliot. The budded peach was a seedling. If we have a good seedling and make a budded tree from the variety, is this budded tree as hardy as the original?

Mr. Connon. I have found that budded and seedling peaches of equal quality are alike tender. The bud makes no difference. The taproot makes no difference. The object of the taproot is to firm the tree in the ground.

Dr. Peebles had 100 trees seedlings, and when the other peaches failed they failed too.

Dr. Spalding. Another use of the taproot is to go deeply into the subsoil and get material from the subsoil which the surface roots cannot get. Large fruit is always gained at the expense of hardiness.

Mr. Tice. I have three trees of the Heath together; two are seedlings, the other is the parent—a budded tree ; the two seedlings were more injured than the original tree. I have two seedlings of the Crawford —the same. Had also two seedlings in the original places; the one was injured the other not.

Mr. Peyton. Give a tree good cultivation and it makes large buds and becomes tender.

Mr. Flagg. Last spring those varieties that had small buds were worst killed. Hale's early, which had a plump bud, did better than the small buds, such as the Crawford.

Mr. Eliot. Change of location may be the cause. The budded fruit came from other locations.

Dr. Spalding. Columbia and Heath cling reproduce themselves from the seed, and it is not claimed that these varieties are hardier than those that are always budded.

Mr. President. To hold this theory, the more we keep budding, the varieties would become the more tender.

Mr. Eliot. Does Mr. Flagg think the best peaches grow here?

Mr. Flagg. Dr. Hull thinks the very best peaches are grown in Alton. The best I have eaten are *off the tree.* These are eaten at home. The market peaches are not as good. In Chicago they like our peaches better. The best locality is a little south of this. The peach is better in the West than East.

Dr. Spalding. I have eaten peaches in Georgia and Alabama, and they are better than the Alton ones. There the clings are so much better than here. The best are in middle Georgia. Where the soils are sandy the peach is not so high flavored as elsewhere. In middle Georgia the soils are clay. A friend planted a large orchard near Savannah; had good crops, but the flavor did not compare with those of middle Georgia. They don't get so much fruit, but very large. Columbia grows as large as my two hands, but very coarse.

J. H. Tice. I corroberate this. In the Cherokee country they are best. There the clings are much better than the freestones.

Dr. Peabody. The moving of the peach crop will be a great drawback. Can they not be profitably carried?

Mr. Flagg. In St. Joseph we called upon a gentleman who put up a small building for canning when they come so low as to not net him $2 25 a bushel. He puts them up in three-pound cans, with six ounces of sugar, and cans about a thousand cans a day during the season.

Dr. Spalding. There is a new patent apparatus for making the cans. By this you can ship the tin and make up the cans. This is better than getting the cans made up; they are so bulky.

Mr. President. A member of this society has set out 10,000 trees in Calhoun county, and intends to can the whole.

Dr. Spalding. There is no reason why we should let our fruit rot on the ground. We bring thousands of dollars' worth of canned fruit from the East to this city every year.

Mr. Wilgus. In Centralia they are forming a company to can their surplus fruit.

Mr. Pearson. What of insects? Borers have done much damage.

Dr. Peabody. I cut them out in May and September. The curculio hurts them in our hills. We set the heads so low that we cannot use the curculio catcher.

Dr. Spalding. The curculio is as bad on the lowlands as the hills, both on the peach and apple.

Mr. Flagg called the attention of the meeting to beautiful specimens of artificial fruit, made by a new French process, that are furnished by Hovey and Nichols, of Chicago. They will furnish copies of fruits at $1 50 to $2. They are invaluable aid in the identification of varieties.

Adjourned.

SECOND DAY.—MORNING SESSION.

The meeting was opened with prayer by the Rev. W. Portens.

Mr. Flagg, in behalf of the Committee on Gallizing, wished to know if they could have an opportunity of examining the samples of wine on exhibition, with a view to determining certain points in relation to that subject.

Mr. Husmann. If there are duplicates of the wine, there will be no difficulty. If not, the samples could pass from the Wine Committee to the Gallizing Committee.

The Secretary stated that no duplicates had been put into his possession. He thought that no complaint could be made on the subject of labels on the bottles forming a key to the exhibitors. Every label and mark had been removed, and the only difference that could lead to identification was placed there by the exhibitors, and was in the differences in the bottles themselves.

Mr. Husmann. I think the Wine Committee is sufficiently honest in the case, and will give an opinion of the wine irrespective of any marks at all.

Mr. Flagg. I would like the exhibitors to distinguish the "gallized" wine, so as to be able to see how far the committee can distinguish the samples.

Mr. Husmann. The most distinguished opponents of gallizing at the last meeting of the society could not tell which was which.

Mr. Kelly. If the committee attend only to the report that may accompany the wine, it may open the road to fraud.

Mr. Riehl. I would like to get at the question of gallizing. It is best that the committee know nothing of the wine, but simply give their report of its quality, and let the Secretary, in his report, give any remarks upon the wine that have come into his possession.

Mr. Flagg. We only want the wine to test, and take the wine as we find it.

The President then announced the following committees:

Committee on Fruits on the Table—Dr. C. W. Spalding, Messrs. W. F. Bowen, H. J. Hyde, T. Walker, J. N. Peyton.

Committee on Wines—Dr. L. D. Morse, Messrs. J. M. Pierson, Alton; C. W. Murtfeldt, St. Louis; Dr. R. Bircher, St. Louis; J. M. Jordan, E. Y. Teas, and W. Patrick.

Committee on Wines from other fruit than the grape—Messrs. E. A. Riehl, H. S. Christian, W. Stark, and J. J. Kelly.

Dr. Spalding inquired if the committee had power to fill vacancies.

The President was of the opinion they had not.

Some discussion was here had about committees on fruit lists, which was noted in yesterday's proceedings because reversed to-day.

Mr. Flagg moved to take up the peach in its varieties. Adopted.

Mr. Flagg. Hale's early is very good for family use and market. It ripens about the 20th of July.

Mr. Spalding. It is a vigorous tree. It rots badly, but there is nothing to fill its place. A few are better than none.

Mr. Flagg. I think it does pay in spite of its rot.

Mr. Guy. I have 800 trees and picked about five bushels of fruit. They should have had about two bushels to the tree. I got $6 a bushel, and the tending of the ground cost ten times that amount.

Mr. Kelly. We should think before we strike off Hale's early. The price may bring it up, though it rots. I had some which sold at from $7 50 to $8. The Troth brought $2 50 to $3.

Mr. Guy—All my fruit was from young trees. Adopted for family use.

Mr. Flagg. Troth's early are well adapted for market and family use. Matures about the 27th of July. Adopted.

Large early York. Good for market and family use. Matures about the 10th of August. Adopted.

Oldmixon free. Matures from 15th August to 1st September.

Mr. Jordan. It is the best. If confined to one single variety it would be the best. It is large, round, white, with red cheek, and of excellent flavor.

Mr. Spalding. George IVth is a very fine peach. There is much confusion here with this variety. Some have it that its name is Royal George, or large early York. It is one of our best peaches. The books do not describe it with sufficient clearness.

Mr. Bayless. George IVth ripens three to five days after large early York. It has a little tinge of green.

Mr. Patrick. George IVth is a fine peach; it ripens after early York. The red is in blotches, and the peach is a little longer than early York. The wood varies. It is more apt to have the fruit uniform—flavor better than early York. It is a little green under the skin; the red breaks off abruptly.

Mr. Guy. The very best. I think Downing gives it for honest John.

Mr. Avery. It ripens ten days after early York. One side is larger than the other.

The smock, good for market and family use, ripening September 20th, was adopted.

Mr. Peyton. Large lemon cling is large—like a lemon—fine market peach. I would like to hear about it.

Mr. Jordan. There are peaches that ripen at the same time.

Mr. Guy. It is tender with me.

Mr. Spalding. I am opposed to clings. The mixon, Heath, and Washington cover the whole ground for clings.

Mr. Clagett. The fruit is handsome.

Mr. Guy. The tree is tender. Lost.

Mr. Guy. Oldmixon cling ripens 5th September.

Mr. Spalding. The best cling we have. Adopted.

Mr. Bayless. Red cheek Melacatoon ripens from 5th to 10th of September.

Mr. Jordan. I think it ripens about the time with late Crawford. Lost.

Mr. Jordan. Late Crawford is a fine peach for market and family use. Matures from 1st to 15th September.

Mr. Spalding. It is somewhat tender. It is the best canning peach we have of the yellow varieties. It retains the flavor better in canning than any other. I have had it for ten to fifteen years, and it comes out the best of any in the spring.

Mr. Flagg. I prefer the Columbia; it is of better flavor, some larger, and has a small stone. From the Crawford we get but a small crop. We grow it under protest.

Mr. Avery. It is large, but a poor bearer. I have had them measure 13 inches round.

Mr. Spalding. I do not speak of its productiveness, but of its value for canning purposes. In the family, even with a half crop of good fruit, it is valuable. Adopted for family use.

Mr. Flagg. My impression is that the Columbia comes first.

Mr. Bayless. When the society votes down the Crawford what can they have?

Mr. Starr. It mildews on one side.

Mr. Jordan. Excellent to eat. We have other peaches finer in appearance. A rich peach for a yellow peach.

Mr. Riehl. Is it tender in the tree? I had a tree I thought to be Columbia; if that was so the tree is tender.

Mr. Flagg. I have eight trees about twenty years old. I am informed it is tender in its buds. This peach was brought into our county twenty-five years ago; came from seeds from Georgia. I have perhaps one hundred trees grown in that way. These seedlings vary in ripening about a month. Fruit of various degrees of color to dark brown. Adopted.

Mr. Flagg. Ward's late free ripens last of September. A fine peach. It fills a vacancy.

Mr. Spalding. It ripens later. One of the best in the season. We want one to fill a place between the smock and Heath cling.

Mr. Wilgus. In Southern Illinois it ripens with Crawford's late. It is a good peach, but not equal to Crawford's late. It overbears.

Mr. Guy. One of the best and most profitable, ripens from 15th to 20th of September, a full bearer, and ripens all the peaches that grow upon it. Adopted.

Mr. Connon moved to reconsider the red cheek Melacatoon. We want a peach just at that time. Adopted.

Mr. T. J. Coleman. It ripens in Wisconsin hardy, where others fail. Has many good qualities.

Mr. Bayless. Trees hardier than late Crawford; quality good—perhaps not quite so sweet as the Crawford. Red cheek Melacatoon was adopted.

Mr. Patrick. Druid Hill ripens 5th September. Fine, hardy tree; stood in 1853 and 1854; good peach. Lost.

Mr. Patrick. Not enough here who know it.

Mr. Jordan recommended the white Heath for market and family.

Mr. Clagett. It meets the wants of a large class of purchasers who want it for preserving. What is good for the family is good for the market.

Mr. Flagg. I am not prepared to vote for it for market. I think it much better this year than common. In Chicago, to be sold, it must not be labeled *cling*. There you cannot sell it *as a cling* for the price.

Mr. Wilgus. They take a different view in Washington county, Illinois. We find that the budded fruit is the best, and *much* superior to that raised from the seed. Heath bears transportation better than any other. I have shipped some to St. Paul, and they sold well. They can be shipped in barrels.

Mr. Clagett. It is always in demand in the St. Louis market, at a good price.

Mr. Peyton. Sells well for canning, and has a large, fine shape.

Mr. Bircher. I had twenty trees for eighteen years. A good bearer, and good market fruit. Adopted.

Mr. Spalding. Washington cling. One of the best clings we have. Ripens between the mixon and Heath.

Mr. Avery. I could not obtain the variety.

Mr. Spalding. It grows more in the Eastern States than here.

Mr. Connon. Spalding described it as round, and N. J. Colman as long. Adopted.

Mr. Guy. Late admirable. Ripens with Heath cling, or later.

Mr. Flagg. I think it ripens about the 15th September. It is a large peach, bears well, but rather tender for market.

Messrs. Spalding and Morse think it ripens before Heath cling.

Mr. T. J. Coleman. I think it comes earlier than the Lagrange or Heath. Adopted.

Mr. Starr. I think the early Crawford valuable. Adopted.

Mr. T. J. Coleman. Lagrange ripens with Heath cling, and good judges prefer it to any other.

Mr. Spalding. I would not recommend them unless they get high cultivation. It has a hard side without high culture. Last season all white peaches did better than usual.

Mr. T. J. Coleman. Where I have seen it it had high cultivation. Mr. Soulard thinks highly of it.

Mr. Flagg. It is the best white peach I know of. My impressions have been uniformly favorable. Upon the bluffs at Alton it does well upon dry subsoil. We should have white peaches for family use. Adopted for family.

Mr. Spalding. I recommend Morris' white for family. Adopted.

Mr. Clagett. I recommend Missouri mammoth for family. It is a large, fine peach, and ripens about with late Crawford.

Mr. Bowen. It is not worth while to recommend it. No votes either way.

Mr. Spalding. I think the yellow rareripe the best of the yellow peaches. It comes with early Crawford, and would take its place; it is a better peach, and would sell for it. Adopted.

Mr. Spalding. I think the president one of the best for family use. Adopted.

Adjourned.

AFTERNOON SESSION.

The special order being the election of officers for 1868, the President appointed Charles Connon and L. D. Votaw tellers.

Dr. Morse nominated T. Mudd for re-election.

President Mudd said he believed the time had come when the society should elect another president. He thanked the society for their kindness and decorum during the five years he had held that office, and peremptorily declined.

After several nominations, the following officers were declared elected:

President.—Charles Peabody, Jefferson county.

Vice Presidents.—J. M. Jordan, St. Louis county, first district.
Tom. Walker, Jefferson county, second district.
Alva Culver, Ste. Genevieve county, third district.
F. Fine, Greene county, fourth district.
J. L. Minor, Cole county, fifth district.
Elldrege Burden, Lafayette county, sixth district.
H. M. Vories, Buchanan county, seventh district.
J. M. Peyton, Marion county, eighth district.
Wm. Stark, Pike county, ninth district.
Corresponding Secretary.—R. S. Eliot, Kirkwood.
Recording Secretary.—Wm. Muir, Fox Creek P. O., St. Louis county.
Treasurer.—John H. Tice, St. Louis.

The place of meeting being the special order,

Prof. Swallow tendered an invitation to hold the next meeting at Columbia, Boone county. The railway could convey members to the place of meeting, as good a place to meet in as this could be had, and the citizens would no doubt entertain the members in attendance.

Invitation accepted.

REPORT OF THE COMMITTEE ON ORCHARDS.

Mr. Gray submitted the following report from the Committee on Orchards:

In the absence of the chairman and three other members of the Committee on Orchards, the undersigned would beg leave to report that the apple crop of the year just closed has been only medium, both as regards the quality and quantity of the fruits.

The extreme drouth in our State, and extending over a large portion of the West, has caused the apples to ripen without attaining their usual size. The peach crop, in the southern half of the State, could only be called a medium crop in quantity; the early varieties were fine, well-grown, and of full size, while the late varieties were smaller and below the standard of excellence, owing to the excessive drouth. In the northern half of our State, except in a fair locality, peaches were a complete failure.

From considerable of inquiry of the members present, I would present the following list of apples as very well adapted to the wants of this State, for both family use and market fruit:

Summer.—For family use and for market: Early harvest, red June.

For market: Sops of wine, red Astrachan.

For family use: Benoni.

Fall.—For family use and market: Maiden's blush, rambo, late Stanbery.

For market: Same with Pennsylvania redstreak, Porter.

Early winter.—For family use and market: Wagoner.

For family use: Newtown Spitzenberg.

For market: Fallawater.

Winter.—For family use and for market: Rawle's janet, Newtown pippin; on limestone soil, Pryor's red, winesap, and red Canada.

Respectfully submitted,

O. A. A. GARDENER,
D. W. BRYANT.

Mr. Kelly. Is this for a whole State or for a single locality? It is wrong to make a list for the whole State.

Prof. Swallow moved to take it up *seriatim*. Adopted.

Names called by the Secretary: Early harvest adopted.

Red June: Prof. Swallow would reject it.

Mr. Stark. It is not a good bearer.

Mr. Kelly. Unless the tree is well attended to it is small, but we cannot get along without it.

Mr. Riehl. I would not reject; near Alton are whole orchards of it. A fair apple if you manure and prune, and sells well.

Prof. Swallow. I may have neglected mine. The ground is perhaps too rich. Trees not old.

Mr. Clagett. It ripens irregularly, but well; I have had it twelve years, and it gives satisfaction. Adopted.

Benoni, for family use, adopted

Sops of wine: Mr. Edwards, strike it out.

Mr. Kelly. To strike out is wrong, without knowing more about it.

Mr. Gardener. I got this apple from the former list; I had asked about it; it was well recommended, and Mr. Gerber says it sells well.

Mr. Bowen: I had it in Ohio for twenty years; it is a great bearer; too small; quality poor but showy; tree hardy.

Mr. Hilliard. Bears transportation best of any variety we have. Mr. Huggins puts it at the head of the list.

Mr. Bowen. It ripens on the tree gradually, over a long time.

Mr. Hilliard. I find its quality not more than second rate. It is large, bears well and regularly, and brings a good price.

Mr. Kelly. I move we pass it.

Mr. Edwards. I recommend it for trial.

Mr. Riehl. Finding it on our list already, I would let it remain. It is a profitable fruit in the Chicago market. Adopted.

Mr. Kelly. We want information about the late strawberry.

Mr. Clagett. I had it in this market last season. It is fine, large size, handsome, good flavor, desirable, and salable.

Mr. Hilliard. It is one of the handsomest and best, but is apt to drop from the tree.

Mr. Tice. It is the best bearer we have.

Mr. Kelly. The fall pippin don't pay for the ground it occupies.

The fall pippin was rejected.

Mr. Riehl never saw enough of the Porten.

Mr. Stark. Some do well. I want a good many of them.

Mr. Hilliard. I sent two to three hundred barrels to the pinery.

They bore transportation well. They are good bearers, hang well upon the trees, and bear every other year.

Mr. Kelly. The Newtown Spitzenberg is one of the best in flavor, but liable to fall from the tree. The children will not need to climb the trees. The fruit all lies on the ground.

Mr. Bowen. It produces better fruit here than in Ohio. It hangs well with us in Jefferson county, and is one of the best for profit—equals winesap.

Mr. Riehl. The Wagoner drops badly. Adopted.

The large Romanite was stricken out.

Mr. Riehl. The fallawater drops badly. Adopted.

Rawle's janet was adopted.

Dr. Edwards. With high culture, on limestone soils, the Newtown pippin will do. I don't think it will do for a market fruit.

Mr. Clagett. My neighbor has twenty trees of it. They give good crops of good apples, and make good cider. I have seldom seen better cider than they make, but they are somewhat liable to scab.

Mr. Stark. On good, high, dry land they are profitable. On ordinary prairie they will not do. They should not be raised extensively.

Dr. Edwards. I reject it as a market apple. It is so unprofitable. Adopted.

Pryor's red and winesap were adopted.

The red Canada was rejected.

Mr. Clagett moved to add the Roman beauty.

Mr. Stark. I have cultivated it fourteen years. It is a good late fall and early winter apple, October and November, but will keep till February or March, but loses its flavor. It was grown on strong land, well cultivated. Trees incline to overbear.

Dr. Edwards. It has done well on thin soil for some years.

Mr. Bowen. It originated on the freestone soils, and bears young and full. It is one of the best we have. Adopted.

Dr. Edwards. I move to add Smith's cider to the list. It is one of the most profitable.

Mr. Guy. It is one of the best we have here. It bears early, but is apt to overbear and break down. It bears regularly.

Mr. Kelly. It is a good bearer every other year, and has but few small apples. It is showy, and sells well here. Adopted.

Mr. Clagett. The willow twig should be put on the list. It keeps and sells well, and is in good condition until March. Adopted.

Mr. Clagett. The Huntsman's favorite is a fine showy apple, grown in the western part of the State. It has a fine aroma, very salable, good bearer, and a favorite in Johnson and other counties.

Mr. Whetworth. I brought it into notice in 1843. I found the apple in Johnson county. It was brought from Lexington. I went upon a visit to Cincinnati in 1844, and exhibited it there. They thought much of it, and got some grafts. It is the finest apple in the county. A man named Huntsman moved to Missouri; he stopped at old Franklin; a friend gave him some seedlings he had raised; he planted them out, and this was one of them. The trees were twenty-three or twenty-four years old when I saw them. Mr. Mock, of Lexington, got them. They keep a long time. They are pale green, turning to a beautiful orange, clear. It was named after Mr. Huntsman, who grew it.

Mr. Sanders. I have some of the trees, which have fruited some. I got them from Mr. Mock. They are good growers, early bearers, upright trees, and bear fine fruit.

Mr. Whetworth. I am planting out 1000 apple trees, and 700 of them will be Huntsman's favorite.

Mr. Riehl. There is more money in the Gilpin than any other good bearer. It ships well, makes good cider, and sells for a good price.

Mr. Clagett. It will do to eat when there is no other.

Mr. Stark. We should be cautious about recommending apples for mere money.

Mr. T. J. Coleman. I have seen it for twenty years from New Orleans to Chicago. It is in the market when there are no others. It outbears and outwears any other. The willow twig is much its superior for quality.

Mr. Kelly. What does market apple mean? I don't eat it, but it makes money.

Professor Swallow. We may recommend a list, and give a few words in explanation of this.

Adjourned.

EVENING SESSION.

Meeting called to order.

Mr. Guy. I move to discuss small fruits in their varieties.

Mr. Murtfeldt. In the order of their ripening. Agreed.

Strawberries were next taken up.

Mr. Gardener. I want information of the Incunda. I have some which yielded well last year.

Mr. Kelly. I had it five or six years ago, and took good care of it. It came from Saul, of Washington. I saw nothing in it that put it equal to Wilson's Albany, and let the clover run it out.

Mr. Spalding. I would recommend it for the market. It is inferior in quality, but till we have a berry that is a surer bearer, yields the same amount of fruit, and carries as well to market, we must cultivate it. It is almost always marketed in an unripe condition, and then any fruit will carry well. I do not think it firmer than other varieties when fully ripe. The color of the seed is the proper test of ripeness. It is ripe when the seeds are brown. Adopted.

Mr. Murtfeldt. Metcalf's seedling came out highly recommended as ripening eight to ten days earlier than any other, and maturing all its fruit at once. It is a good grower and hardy. I am the happy owner of a dozen plants, enormous growers, but I have never seen the fruit. Anything that will come out as a new thing, all that is said about it will be swallowed, but when we merely change, and that to inferior varieties, we fail. No votes.

Dr. Spalding. Longworth's prolific is an old variety, out of cultivation. I saw it at Dr. Hull's place, along with many of the newer sorts, including the agriculturist, Wilson, and others. I examined all of them at the same time; there was double the fruit upon them than any other variety, and quite as good—bearing the fruit up well from the ground. I would rather have it than many of the new sorts. There is no complaint about its shipping qualities.

Mr. Votaw. I find no difference in the shipping.

Mr. Kennedy. I have had it five or six years side by side with Boston pine, Wilson, and McEvoy. As a general crop I prefer McEvoy to either. McEvoy for table fruit, Longworth for the supply.

Mr. Flagg. An extensive cultivator in California says it is one of the best varieties there. We should look it up and plant it more.

Mr. Votaw. I made more money per acre from it last year than I did from Wilson. Adopted.

Mr. Guy. The Russell, for family use, does not bear quite so heavy a crop, though it is large and has fine-flavored berries.

Dr. Spalding. Mine have not done well.

Mr. Eliot. I have it and Cutter, and prefer Cutter.

Mr. Flagg. In testing twenty varieties, including Longworth, I find Wilson best, taking all things into consideration, and Russell second. It is a good bearer and bears good fruit.

Mr. Gardener. It measures well.

Mr. Spalding. There is an objection on account of its being a pistilate variety. We must always have a staminate along with it, and it is not always convenient to have more than one variety.

Dr. Morse. The Filmore, for family use, is three times better than the Russell.

Mr. Kelly. I would like to hear of some of its good qualities.

Dr. Morse. It is a good fruit, moderately prolific, fine bearer, but needs a fertilizer. Would plant for family use.

Mr. Gardener. I find it worth a trial. It is a good bearer.

Mr. T. J. Coleman. I fruited it a number of years. It is a good size, dark color, sells well, passes the crisis of ripening quickly, and loses its flavor quicker than any other variety.

Dr. Spalding. I urge against recommending any pistilates, when staminates are as good.

Mr. Murtfeldt. I take the same view.

Dr. Morse. I think it is different in raising them for family and market, and think the objection has not so much force.

Mr. Eliot. I don't know anything about Cutter's seedling. My wife thinks it the best of all varieties. She thinks Wilson's one of the best, and Cutter's the very best; lasts longer than any other, and does not lose its flavor so much as the Russell.

Dr. Spalding. My wife indorses that.

Mr. President. It is of handsome color, stands up from the ground, and is much superior to Wilson upon the table, and gets more berries from it than Wilson—the best we have. Adopted.

Mr. Kelly. In relation to McEvoy's superior, I think the question should be between staminates and pistilates for family.

Mr. T. J. Coleman. I grew it in Southern Illinois, and shipped it to Chicago, where it was highly spoken of. With the Iowa for a fertilizer it does very well.

Mr. Murtfeldt. I saw it at the Prairie Farmers' exhibition under the name of Buffalo. It took the premium, and was beautiful indeed.

Mr. Kelly. If it is of such value it is worth some care and labor. We can use it without sugar, and then we can taste the fruit.

Dr. Spalding. There is no question about the quality. It makes a good crop, and I have seen it six inches in circumference; but it is difficult to impregnate, and is almost deficient in stamens. It must be fertilized with a variety blooming at the same time, like Iowa, which is a good market berry, coming early, but needs as much sugar as berries to make it palatable.

Mr. Kennedy. How would they do in alternate rows?

Dr. Spalding. Alternate beds or acres will do. The pollen seems to fill the air completely, and they are apt to mix in rows. Adopted.

Mr. Flagg. The Jenny Lind will do very well for family use, as it comes early; it is well to have it.

Mr. President. How many acres to get a quart?

Mr. Gardener. I planted two dozen plants and got five berries. Rejected.

Dr. Spalding. The French has not succeeded well with me; soil is rather poor; but will try it again.

Mr. T. J. Coleman. It promises well, bears drouth better than any other variety, has a handsome form, promises well for market, and is later by two or three days. Rejected.

Mr. Murtfeldt. A very extensive grower in Southern Illinois, P. H. Skinner, Marengo, adopts an excellent course of cultivation. He cultivates deeply, subsoiling 15 to 18 inches, and puts his ground in thorough order; plants in rows four feet apart, and the plants about 15 inches, and gives thorough cultivation during the season. After the ground is frozen, he covers them with mulch. In spring the mulch is drawn off the plants, and a slight sprinkling of earth put on it. In this manner the moisture is retained in the ground, and at least eight inches of rich earth is maintained. The early rains settle it, and the earth keeps it in place, thus preventing the plants from being affected by drouth, as they so frequently are, especially toward the end of the fruiting season. He puts up his fruit very nicely, keeping a woman expressly to top off the baskets, and have all the berries in order. He thus easily nets $1000 from four acres.

Dr. Morse. I think this will be good for late berries. I think I succeed better by letting the plants cover the ground, and have the ground clean, get two crops and then plow under. I am satisfied this is the most profitable course. At South Pass they are trying a very simple mode. They clear off the new ground, burn up the trash, then make holes with the hoe or mattock, and set out the plants. They get a few good crops before the weeds take the ground, and have so far obtained good results.

Mr. Kennedy. I think tanbark produces the finest show of blooms of anything I have seen tried.

Mr. Flagg. I take an opposite opinion to Dr. Morse. I think that, as a general rule, where we have snowless winters it will be found good to mulch after the frosts set in. As to the later ripening I am not sure, but the quantity is increased. Our special danger is in the last of the crop drying out. Mulch prevents this. Some of our best cultivators are trying spring cultivation.

Mr. Murtfeldt. Mr. Skinner allows the runners to take possession of the ground in the middle, and gets a crop from them.

Dr. Morse. I recommend mulching in winter. I tried spring cultivation, and did not like it.

The raspberry was next taken up.

The Doolittle, for general cultivation, elicited no remarks.

Mr. Guy. The purple cane does well with little care. I take it over a rough road to the depot and send it up in the cars. It comes here in good condition and sells well. It is a better berry than the Doolittle.

Mr. Flagg. I have had no experience in cultivating the Miami for market and family use, but have learned a few facts in relation to it. There are 75 acres in cultivation at Collinsville. It is good and profitable.

Mr. Henwood. I have seen it for years in market; it is as large again as the Doolittle, and better.

Mr. Flagg. It is said to be five to eight days later than the Doolittle. It is large, and nearer a brown than a black.

Mr. Hadley. It is preferred by me. It is an Ohio variety, and should be called the McCormick, instead of the Miami.

Mr. Whittlesey. The only good raspberries I know are the red and white Antwerps. All the black caps are dry. Are those spoken of more juicy, or like the others, only a parcel of seeds?

Mr. Flagg. I think it rather dry, but more juicy than the Doolittle.

The President. I have it, and the Doolittle and purple cane. It is larger, better, seven to eight days later, and much more juicy. I like it much.

Mr. Bowen. In regard to the name, I would say that Mr. McCormick named it the Miami himself.

Mr. Spalding. I am growing the Philadelphia on a small scale. It is productive. I think more of it than any of the varieties I have grown. It is firm, and bears carriage. It propagates slowly, which is the principal objection. It is of a dull grayish red—not attractive. Its quality is better than the Doolittle.

Mr. Kennedy. I think the North river, Antwerp, Binckle, and others of that family can be grown profitably, with winter protection. Lay down and cover them with earth.

Mr. Teas. I would like an opinion on the Catawissa.

The Secretary. I have had it quite a number of years and like it very much. It is hard to get it make enough of plants.

Mr. Spalding. I object to the fall or so-called everbearing varieties. They come when there is plenty of other fruit, and nobody wants them.

The Secretary. It is in great request for preserving and flavoring, and brings a high price. It is really the most useful of the varieties.

The blackberry was next considered.

The Lawton elicited no remarks.

Mr. Flagg. I have had no experience in raising the kittatiny.

Mr. Eliot. What about the Dorchester?

Mr. Spalding. A family needs a large patch. It is a good berry.

The President. I have been asked for my experience. I would take up the Lawton rather than the Dorchester. If gentlemen like an acid berry they won't like the Dorchester. They give fruit a long time. One year I failed to mulch and they lasted three to four weeks; with mulch they bear six to eight weeks. They do not produce more than one-third as much as the Lawton.

Mr. Spalding. The Dorchester does not color till quite ripe. The Lawton colors before it is ripe. They are generally gathered before being ripe, and then turn brown.

The President. Has not the Lawton a peculiar color, that enables any one to tell when it is ripe? When in contrast with the green leaves it looks well, but when gathered it changes in a few hours to a reddish cast. It is a very deep black, with gloss, and you can tell from the color when it is ripe, but it will not take to market in that condition.

Mr. Murtfeldt. I think it takes more care than any other berry. On the Hudson they say it will not keep six hours after it is ripe. Just then it is excellent.

Mr. Spalding. Have any of our growers fruited the Missouri mammoth? It is highly spoken of.

Mr. Bowen. I tried Wilson's early one season; I think well of it so far.

Mr. Flagg. I think all agree with Meehan, that it is more of a dewberry, or at most a hybrid. I think it partakes more of that character.

Mr. Flagg. I want information in relation to crystal white. I saw it upon Mr. McPike's place. It is reasonably productive. I think for family use it will be good.

Mr. Spalding. I have seen a white blackberry; it is good, but product small.

The Secretary. I had it six to eight years. I think more of it each year. It is of fine upright form. The berry is long, white, and sweet. It improves much in bearing as the plants get age.

Mr. Henwood. I had a few of a white variety eight years. I did not get much fruit. I have eaten a good white berry from Mr. Tice.

Mr. Eliot. Thomas L. Saulsbury had a fine blackberry from Chariton county, but too soft for market. It is of good size.

The subject of currants was next taken up.

Mr. Eliot. The cherry currant is very good for family use.

Mr. Spalding. I think it very acid.

Mr. Flagg. It is large, and I think much of it for market use; it is as productive as the Dutch, and much larger, and it can be sold at a good price.

Mr. Spalding. I doubt if any one has found the currant profitable, in this latitude, for market; its home is further north. The cherry is, perhaps, the best of the varieties.

Mr. T. J. Coleman. I thought, some years ago, it would not be profitable here. Now I have changed my opinion; it will pay if you get no more than four dollars a bushel.

Mr. Kelly. I am afraid it will take too much manure; and then you will raise more weeds than fruit.

Mr. T. J. Coleman. My ground is rich. I mulch with leaves, with great success.

Red Dutch currant, for market and family use, was next taken up.

Mr. Flagg. I think that currant culture will pay—perhaps not so much as some other fruits, but it is a tolerably certain crop. When other fruits fail, it will pay well. Will pay to make into wine.

Mr. Murtfeldt. We need to take good care of it; it will pay for manuring, but will not bear neglect. If grass gets in among the bushes the currants will go out. Give it half shade, for it is a northern plant. You can make a good wine, but it will not sell in market.

Mr. Spalding. I am touchy on this point of wine. I am of the opinion you will get grape wine more cheaply, and bring it into market so as to put out currant, rhubarb, and parsnip wine.

Mr. Flagg. I don't see why sugar and water should not be applied to currants, and called wine, as well as to grapes. Currant wine has long been recommended as desirable for the sick; the grape wine, unless gallized, is too acid to be used by many.

Mr. Kennedy. With the currant and gooseberry I differ in regard to mulching; to leave them bare is better for their bearing qualities. A bush is not wanted to last too long; there is always a young one coming up to take its place, which will bear larger fruit. The pruning is more important than the growing. The gooseberry needs deep soil, the currant shallow; train up to one stem, and keep the grass away. Keep the gooseberry in the shade, the currant in the sun.

The white grape coming under consideration—

Mr. Flagg objected to its cultivation on the ground of unproductiveness.

Mr. Eliot. I indorse Mr. Flagg's opinion; it is a poor bearer.

Mr. Bowen. With me this variety bears better than either of the others.

Mr. Henwood. It requires some protection, but bears as well as the red Dutch.

Mr. Stark moved that the committee having the fruit on the table in charge recommend some, and make a separate list of them.

Adjourned.

THIRD DAY.—Morning Session.

The meeting was opened with prayer by Rev. T. M. Post, D. D.

Mr. Peabody moved that the Reverend Dr. Post be elected an honorary member. Adopted.

Dr. Post. If in order, I would like to express my grateful sense of this honor, for I truly appreciate it as such. I would also express my earnest sympathy with your interests and beautiful pursuit. It is only because I am called into so many fields of labor, and cannot follow my taste, that I am not with you constantly; and I wish it to be understood if I am not here in person that I am with you in sympathy and spirit. I believe you are laboring for a great public good. Gentlemen, I thank you heartily.

Mr. Flagg offered the following resolution:

"*Resolved*, That the Secretary be requested to make up and submit to the society, at its next meeting, a list of all the varieties of fruits recommended by this society for any purpose, and that thereafter the discussion of fruits shall be limited to the changes of this list." Adopted.

By the same:

"*Resolved*, That as regards the sample of artificial fruits presented by Hovey & Nichols, of Chicago, they are most remarkable for their exact imitation of form and color, and that we recommend them as valuable aids in the study of pomology." Adopted.

REPORT OF THE COMMITTEE ON VINEYARDS.

Mr. George Husmann presented the following report from the Committee on Vineyards:

REPORT.

This season was one of the most remarkable we have ever had here. A very late and backward spring, so much so that serious apprehensions were entertained about the ripening of grapes, followed by an extremely dry and warm summer, and a very late, dry, and mild autumn, so that grapes could attain a perfection which we seldom see here, even in our favored clime, where that fruit ripens always. The vintage of 1867 will long be remembered for its generous wines, I think.

When we come to sum up the past season's experience, we find that it but confirms the experience of former seasons. The Catawba, although its friends prophesied a good crop because the summer was unusually dry, has shown again that it has put at defiance all calculations. In the majority of vineyards it rotted and mildewed so badly that but very little remained, while in a few locations it was almost exempt from rot. These were mostly in those island locations where the soil was strongly mixed with sand and debris from the sandy cliffs above.

The Concord, although somewhat subject to the rot, has given a satisfactory and abundant crop everywhere in this neighborhood. It seems only to rot enough to thin out its over abundant crop, and has shown again that it is one of the most reliable varieties.

Norton's Virginia sustained its old established character fully, and I can only say that I have never yet seen a rotten berry on it, the Cynthiana, or Arkansas. It produced a moderate crop, of excellent quality.

The Herbemont. Wherever the location suits this noble grape, it is, when covered in winter, one of the most reliable and abundant bearers. In low locations it suffered somewhat from mildew, but in all high, well ventilated grounds, it ripened a splendid crop.

Delaware has done better this season than ever before. It ripened its fruit perfectly, and held its leaves well, also made a very promising growth of wood. Perhaps we may learn to manage it yet, and it is well worth a little extra pains; but it will never be a grape for everybody to plant.

Of the varieties which have been entirely healthy this summer, and promise well, I will name the Cynthiana, Martha, Arkansas, Creveling, North Carolina seedling, Cunningham, Louisiana, Rulander, Maxatawny, and Roger's No. 1. These have all been tried by me sufficiently long, so as to recommend them with confidence in our vicinity. I have fruited most of them five to six years, and found them uniformly healthy and productive.

Among those fruited only one or two years, but which I think very promising, I will mention Rogers' hybrids Nos. 3, 4, 9, 12, and 19. The fruit of all these is of fine quality, and so far they are healthy, and seem to be productive. Salem, said to be the best of Rogers' hybrids, has not given satisfaction so far. The fruit is of excellent quality, but sets rather imperfectly, and also suffered somewhat from leaf blight. It may improve with age. No. 15, although considered one of the best at the East, is very unreliable here, and has a sharp, rough scratch in its taste which I cannot admire.

Among those which have proved unreliable again, I will name the

Catawba, Iona, Diana, Israella, Tokalon, Devereaux, Union Village, and Allen's hybrid. Others, although reliable, are of such poor quality that I consider them unworthy of cultivation. I will name among them Dracut Amber, Northern Muscadine, Logan, and Oporto.

I had almost forgotten the Clinton. This I think of but little value. It is an enormous grower, a tolerably fair bearer, makes a heavy must, but its wine has a peculiar frost grape flavor which I cannot admire, and its foliage is not healthy. If we had nothing better than Catawba, nothing more reliable, the Clinton would do, but it will not do by the side of such grapes for red wine as Norton's, Cynthiana, or Creveling.

Hartford prolific set poorly with me this season, the first one I have had this happen, and produced but a scant crop. It generally is a very abundant bearer, and a reliable early grape.

Ives' seedling. I had hoped to make wine of this grape of Ohio notoriety, as I had twenty-five strong vines, going into their third summer, but I was sadly disappointed; they did not produce more than a few scattering berries; and the fruit and wine I have seen of it from Ohio make me fear that I have planted too many already. I think it has been overpraised, and those who can obtain the Norton and Creveling should not plant the Ives. The Creveling, I think, has been overlooked too much as a wine grape. It will make an excellent claret, of very fine flavor, and much superior to any Ives wine I have seen. I give below a table of the weight of must of different varieties, as measured by Oechsle's scale:

Cynthiana	118	degrees.
Norton's Virginia	115	"
Cunningham	112	"
Rulander	110	"
Delaware	105	"
Clinton	103	"
Taylor	100	"
Cassady	96	"
Herbemont	94	"
Martha	92	"
Catawba	90	"
Creveling	88	"
North Carolina seedling	84	"
Concord	82	"
Diana	82	"
Rogers' No. 9	80	"
Rogers' No. 4	76	"
Rogers' No. 1	77	"
Hartford Prolific	76	"

GEORGE HUSMANN.

Mr. Husmann said he had a letter from a member of the committee:

which was of interest, and would hand it to the Secretary, of which we present extracts:

"ST. JOSEPH, MISSOURI.

* * * "As I will not be able to see you I thought it might not be unacceptable to give you some information in reference to the vineyard interests of this part of the State. * * * There is great interest manifesting itself in this part of the State, and with the best prospects of ultimate success. There are in this neighborhood several individuals engaged in raising and training vines. Mr. Madinger has several thousand vines, a great portion of which are in bearing, from which he has made, the present season, nearly two thousand gallons of most excellent wine. Mr. Rathbon has about six thousand vines, which are doing well; he has also made considerable wine of excellent quality this season.

"Mr. Pattee has also some six or seven thousand vines in bearing; they have done well this season, and his wine is also good. My partner and myself are planting out a vineyard of from ten to twelve acres. Our vines are generally doing well, though but few of them are in bearing, though the Concord vines which were in bearing this year exceeded all expectation.

"Mr. Davis is also putting out a large vineyard, and so with Mr. Gilliam, Mr. Ritler, and several others. A large amount of vines will be planted out the present spring; almost hundreds are preparing to plant vines, some on a large scale, some on a small, all seeming to think that the question of success has been settled with proper management.

Our neighbors across the river, in Kansas, are also setting out grapes by the thousand, and the prospect now is that in a few years wine will be one of the staples of the country.

"The Catawba grape is not in very much favor here, except in particular localities. In some localities it has done well, but it is too much subject to rot to be generally relied on. The Concord is rather the favorite, though we are trying Norton's Virginia and the Ives, and believe they will both succeed well, and, in fact have a great many other varieties on trial, but they are not planted largely. We have every confidence here that we will succeed in raising good grapes and in making good wine, and in sufficient quantities to be amply remunerative. Our people here first commenced setting out their vines only four feet apart each way, but that is abandoned. They are now set six by six and six by seven, and we are getting to believe that it might do better to set them still wider apart.

"All these things will, however, be tested, for I assure you that our people are in earnest about raising grapes. * * * We will send you a few bottles of our wine at your next meeting, so that you may all see whether we will be apt to do any good in wine making or not.

* * * * * * * *

"Truly your friend,

"H. M. VORIES."

Mr. Husmann. In Gasconade county there are about five hundred acres planted.

Mr. Guy. In Jefferson county there are about two hundred acres of vineyard planted, most of which will be in bearing next year. In one or two places Concord rotted from neglect.

Mr. Flagg also gave a verbal statement about some of the vineyards about Alton. We suffered somewhat by the frost of the 7th of May, when the temperature fell to 3° and injured the young buds. Several had very good crops. I was struck with the Creveling in Mr. McPike's vineyard; it was healthy, and of excellent quality. We should pay more attention to it than we do. The Catawba did not suffer much. In the latter part of August I visited St. Joseph, Mich., to see some vineyards. It is remarkably free from frost for its latitude, lying on Lake Erie. The peach crop was successful, and they have commenced growing grapes. The prospects are very encouraging. The vineyard of Mr. Whittlesey was remarkable for its fruit and foliage. A large amount of fruit was set when we were there. The principal difference was in the plumpness of the bunches, as if they were less perfectly developed. They may raise good fruit for market, but it will lack quality for wine without gallizing. Report adopted.

The Rev. Charles Peabody then delivered the following address on

VINEYARDS AND TEMPERANCE.

Vineyards are very old institutions. They date back almost to the origin of the human race. They were planted immediately after the flood, on the slopes of Ararat, under the very shadow of the ark. The sculptured monuments exhumed by Layard, along the banks of the Tigris, give proof that three thousand years ago vineyards abounded on the Assyrian hills. Among the dense populations of the river Nile, on the dividing line between the annual inundations and the desert, the vine then grew and flourished, as we now read on the stony records of their royal tombs. Even in that unfavorable locality, according to the record of the dream of the chief butler of Pharoah, that trusty servant pressed out with his own hand the rich juice from the cluster, and presented it to his master's lips. The fugitive sons of Israel as, under the leadership of Moses, they pressed forward across the desert, were promised, when they should arrive among the hills of Canaan, vineyards in abundance, which other hands had planted for them. The traveler now sees here and there among those now desolate hills, which once flowed with milk and honey, and boasted of their olive groves and vineyards, wine presses cut in the solid rock, made perhaps in the days of King David, or even in the time of the Judges.

Three thousand years ago the sunny hillsides of Greece, and those adjacent rocky islands of the Ægean sea, were crowned with vineyards. A thousand years later, in Southern Italy, the immense vineyards of Campania and the adjacent hills supplied the markets of the Roman world with the celebrated Massic and Fallernian wines. Thus vineyards have grown and flourished from age to age, extending from country to country, into all lands which have proved favorable to the culture of the vine. Much of the territory of modern Greece, Italy, France, and Spain, with the adjacent islands of the Mediterranean and parts of Germany and Switzerland, is occupied by vineyards. From first to last, the chief product of all those vineyards has been *wine*. It has been, and is still, an important article in the commerce of the world.

In close connection with the products of the vineyard there has existed in all ages of the world a considerable amount of drunkenness. The planter of the first vineyard we know of, on the slopes of Mount Ararat, alluded to above, drank of the fruits of it to excess. Floating scraps of history, embellished by the genius of Byron, depict the scenes of revelry and drunkenness in the court of Sardanapalus, last monarch of Assyria, six hundred and fifty years before Christ. A hundred years later, the last monarch of the Babylonian empire, in his midnight debauch, where a man's hand appeared and wrote his doom on the wall, ordered the sacred vessels of the Jewish Temple to be brought forth, in which his princes, his wives, and his concubines drank wine, and praised the gods of gold, and silver, and of brass, of iron, of wood, and of stone. A thousand years earlier still, the sculptured monuments of old Egypt, yet legible, disclose scenes of drunkenness. In one picture, cut in the hard rock, women are represented as spewing from their mouths the surfeit of their wine, as they recline at table. There always seems to have been a logical, not to say necessary, connection in all ages between vineyards and drunkenness. This is not denied by any friend of the culture of the vine.

Now drunkenness, or intemperance, is one of the most stupendous evils of modern society. Its victims may be counted by hundreds of thousands. In its ramifications of woe and horror it penetrates into the most sacred precincts of home, and entails untold miseries upon multitudes of innocent victims. He who shall discover the means by which it can be eradicated, or by which it can be essentially diminished, will be a benefactor to his race.

To a man of philanthropic feelings, as he surveys, in all its sickening detail, the woes and miseries produced by drunkenness, the first impulse is to remove from the world, exterminate, root out, destroy everything from the face of the earth which can cause or which promotes this vice. But to do this is seen at once to be a physical impossibility. He who would stem this awful tide must therefore try some other remedy. If he cannot stop the full current of wretchedness produced by drunkenness, it is wise and philanthropic to do the next best thing—to stop all he can. If there be now one hundred thousand drunkards in the United States, and he can reduce them to ten thousand, he has accomplished a noble result.

Now let us trace the history of drunkenness, or intemperance, in a few words. There is no proof that drunkenness prevailed as a serious evil among the common people in ancient times. This seems to be a modern institution. There were individual instances, and there occurred scenes of drunken revelry, as we have seen. But in its widespread and devastating effects among the masses of the people, we see nothing of it till comparatively a recent period. It began to spread itself and make great headway soon after the alchemists of comparatively modern times, in their vain search after a universal solvent, had stumbled upon the process of manufacturing by distillation a stronger, a more fiery beverage than the product of the vineyard. This would seem to imply that gin, rum, brandy, whisky, and other distilled liquors have produced most of the mischief. Another fact confirms this view of the case. Those countries where the vice of intemperance mostly prevails do not produce wine, and consequently the people are obliged, if they must have some stimulants, to depend upon distillation, or the more filthy process of .brewing. England, Ireland, Scotland, Norway, Sweden, and the United States present us drunkards by thousands, while in France, Spain, Italy, and Southern Germany, where numerous vineyards supply the people with a milder and less exciting beverage, but little drunkenness is found. It is also a remarkable fact that in these latter countries distilled liquors, as an article of common drink, are scarcely known. I can add my humble testimony to the almost universal testimony of travelers in wine countries, that in spending seven months among the vineyards of Germany, France, Switzerland, and Italy, where wine among the common people was a common substitute for coffee, I never saw but a single instance of drunkenness. At the same time the universal testimony of leading men of those countries—lawyers, civilians, clergymen, and others—was that drunkenness was almost unknown. I remember witnessing scenes of festivity and mirth on some special fete days, where a little less wine would have been better for all concerned, but it seemed to produce no bickering or quarreling, no drunkenness.

There is one fact which seems to be admitted by all observers and writers upon the appetites and passions of the human race: It is, that besides the food necessary for the sustentation of the body, there is among all nations and all classes a strong desire for some stimulant in addition. There is probably not a nation or people on the face of the earth, however barbarous, which has not invented some stimulating beverage. In the face of this universal fact, the scheme for removing drunkenness by destroying entirely everything which can intoxicate, would be like an attempt to remove gunpowder from the world to prevent people from being shot, or to destroy water so that nobody should be drowned.

Mankind will have some stimulant. If you take away one, they will resort to some other; and if you sweep away all, the genius of the nineteenth century will invent something entirely new, and take out a patent on it besides. The question then comes back to us, as friends of temperance, of humanity, as well as friends of horticulture and the vine—What shall be done?

Our true position, I believe, is that assumed by our President in his annual address. It is, that the multiplication of vineyards and the production of large quantities of pure, cheap wine, will diminish the vice of drunkenness and promote temperance among the masses of the American people.

Some of the reasons for this position are the following:

First. The general introduction of pure light wine, afforded cheaper than whisky and other fiery drink, will in time supplant the latter entirely. It is likely that the change would not generally affect the present generation of drunkards. They would hardly be satisfied with the milder stimulant afforded by the vine; but in a decade or two of years they would all die off and disappear, and a generation would come on the stage which would be entirely satisfied with such stimulants as our mild native wines afford. There would be some intemperance even in the use of wine, but it would be insignificant when compared with that which now prevails, in the use of distilled liquors. Could this change be effected, there is every reason to suppose that the same results of the free and common use of wine would prevail here as we find in the south of France or Italy. If there are two evils, and we are left to choose, it is always logical and right to choose the less.

Second. Men can never be reformed or made to forsake an evil path by force. You can never legislate a man into doing right. You can punish him when he does wrong, but when you come in contact with his tastes, or appetites, or passions with your prohibitory or sumptuary laws, his stubborn spirit will rebel at once. It will be found that in the end you have made no progress in reforming him. But if you allow him, under proper inducements and influences, to choose for himself what he shall eat and drink, he becomes docile and easily directed. Thus he makes the change from dangerous to safe paths imperceptibly, and without the consciousness of losing his independence. The application of this principle to the case before us is plain. Attempts have been made, for many years, in several States, to suppress intemperance by prohibitory laws. They have all most signally failed, and in many of those States there is now as much drunkenness as ever. Now it is proposed to offer a comparatively harmless beverage as a substitute for that which has proved to be fraught with so much mischief. It is purer, more palatable, and less expensive. There is little doubt as to which will be chosen. The pure product of the vineyard will be the voluntary choice of the people, and whisky, with all the brotherhood of strong, artificial stimulants, will disappear. The right of human society to protect itself by penal enactments, and to punish men for drunkenness or disturbing the peace, is not denied in the above allusion to the effects of laws prohibiting the manufacturing and sale of intoxicating drinks.

Third. The introduction of pure wine as a universal beverage among the people will promote temperance among them by means which are in accordance with the principles of divine government. It is generally admitted that mankind in this world are in a state of probation, or trial. According to the scripture account of the origin of our race, the first human pair were exposed, at the outset, to a sore temptation. A beautiful tree, growing in the midst of the garden of Eden, and laden with delicious fruit, was not to be touched under the severest penalty. By thus affording a strong temptation, it would seem that the Infinite One designed to call into life and stimulate in the human bosom the principle of virtue. It is likely that all the temptations to evil which environ our pathway on earth are designed by the same Being for a similar purpose. In fact there can be no such thing as human virtue without temptation. If I have no power of choice to reject the evil and choose the good, but must, of necessity, be forced along in the path of rectitude, I am nothing but a machine. But if I encounter strong temptations to evil, which I resolutely resist, I acquire a quality of soul—call it virtue or what you please—which is the highest and noblest quality a mortal can possess. Now the attempted process of making men temperate by prohibiting the manufacture and sale of everything which can intoxicate, thus removing it entirely from their reach, may if successful, result in making them temperate, but they will become so of necessity. They will have acquired in the process no noble, exalted strength of character, no virtue by resisting temptation. There can be no merit attached to character thus molded of necessity. Those who advocate this method of promoting temperance, had they lived in a very ancient period we read about, and had they carried out principles they advocate, would have gone into the Garden of Eden, ax in hand, and hewed down the tree of knowledge of good and evil, in order to prevent the temptation and fall of man. The successful substituting of the noble products of the vineyard for the vile compounds which now so largely constitute the drink of the American people, leaves them free to choose; but at the same time there is a very strong probability, amounting almost to a certainty, that they will in the end choose correctly.

In submitting the above views, let me be understood as taking no ground against the moral means in use for the suppression of the vice of drunkenness; but, on the other hand, even if pure native wine should succeed finally in supplanting the vile beverages now consumed, it may be necessary to hold up drunkenness as a crime against God and man, to urge upon all, both old and young, the danger of self-indulgence, and the consequences of intemperance. I would proceed on precisely the same principles which govern us in shunning all the other dangers by which our pathway in this world is surrounded. Gunpowder is a dangerous compound. It has destroyed, in one way and another, millions of human lives. Shall I, therefore, put it away entirely beyond the reach of my boy? Nay, rather, I will give him early instruction concerning its use and its dangers, and carefully explain to him how and under what circumstances it may injure him. And when I put a gun into his hands and start him off over the hills upon the exhilarating pathway of the hunter, I will remind him, with parental emphasis, that he bears in his hands and slung about his neck the certain implements of death, which a trivial error or forgetfulness may cause to become fatal to his companions or to himself. Just so would I say to the young men of my country concerning the dangers of intemperance: "Behold yonder hills and slopes crowned with vineyards. They gush forth with the generous vintage. There are beauty, and joy, and gladness in the very air. Tread out the grapes, and carry home the rich product with a merry heart; but never, never forget that 'wine is a mocker, strong drink is raging, and whosoever is deceived thereby is not wise.'"

The Rev. Dr. Post had listened with a great deal of interest and a great deal of pleasure to the address just read, but he thought Dr. Peabody was not sufficiently explicit on one point, with respect to the police regulations and intemperance. He considered they had a right to protect themselves against certain annoyances and breaches of the peace that sprung from intemperance.

Dr. Peabody amended his essay in the point alluded to, as he had written it in great haste. At the same time he said he did not believe in legislating for the purpose of curing men of drunkenness by removing all things out of their reach.

Mr. Mudd then vacated the chair, and in so doing begged to thank the members of the society for the uniform kindness and assistance which had been extended to him.

Dr. Peabody, the newly elected President, then took the chair. He assured them that he would do what he could to advance the interests of their society, which, under Mr. Mudd, had attained so high a standing in the State, and he trusted that he would have the earnest co-operation of all its members.

Dr. Edwards moved that they tender their best thanks to their late President for the faithful, able, and impartial manner in which he had discharged all the duties of his position for the last five years.

The motion was seconded by several members.

Dr. Spalding paid a high tribute to Mr. Mudd, who, he believed, had done more than any other man to place the society in its present very prosperous and flourishing condition.

Mr. Flagg, on behalf of the members from the State of Illinois, expressed the sense of their deep obligation to Mr. Mudd for his uniform kindness to them.

The resolution was adopted unanimously.

Dr. Spalding moved that their thanks be also given to the other officers for the past year.

Mr. Murtfeldt seconded, and it was carried.

The committee on the classifying of peaches presented the following report, with the time of ripening of the different varieties:

Hale's early, July 20th.
Troth's early, July 30th.
Large early York, August 7th.
Crawford's early, August 10th.
Yellow rarepipe, August 10th.
Oldmixon free, August 20th.
Oldmixon cling, August 25th.
President, ———.
Morris' white, ———.
Stump the world, August 30th.
Columbia, September 5th.
Crawford's late, September 10th.
Washington cling, September 15th.
Ward's late, September 20th.
Late admirable, September 20th.
Smock, September 25th.
Lagrange, September 25th.
Heath, September 30th.

St. Louis has been taken as the latitude in fixing the dates of ripening of the foregoing list of peaches.

The report was adopted.

Mr. Riehl, from the Committee on the Uniformity of Fruit Packages, submitted the following report:

When this committee was appointed it was contemplated to take steps to procure uniformity in size of the various fruit packages, by legislative action; but subsequent investigation into the matter convinced us of the impracticability of such a measure, and while busy devising some means to accomplish the wished for result, the cental system was about being adopted in the handling and sale of grain, and we hoped that it would also be applied to the sale of fruits and vegetables; but unfortunately the system fell through for reasons not necessary to inquire into now. But so thoroughly convinced are we that selling by weight is the best method that can be adopted in the sale of all fruits and vegetables, that we would urgently recommend the following resolutions to be adopted by the society, and published in the transactions:

Resolved, That this society respectfully request the honorable board of common council of the city of St. Louis to pass an ordinance permitting the sale of fruits and vegetables within the city limits by weight.

Resolved, That the members of this society sell fruits and vegetables by weight whenever practicable, and induce others to do so.

On motion, the report and resolutions were adopted.

Dr. Edwards offered the following, which was also adopted:

"That a committee be appointed whose duty it shall be to ascertain what would be the usual weight of different kinds of vegetables and fruits per gallon and bushel, and report at our next meeting."

The following gentlemen were appointed to serve upon the committee: Dr. Edwards, Messrs. Muir and Mudd.

Dr. Clagett gave an account of the cases of the inspector of weights and measures in the strawberry case, which was finally decided in the circuit court in favor of the defendants.

Mr. H. T. Mudd called the attention of the society to the fact that we had, published in the State, three papers devoted to the interests of the cultivator of the soil: The *Rural World*, *Journal of Agriculture*, and *Horticulturist and Farmer*, and suggested that these should be taken by the members of the society before others outside of the State be taken.

Dr. Edwards called attention to a difficulty that lay in the way of the grape-vine planter, in getting his plants with too short stems. They were sent out with canes not more than from one to two inches in length, and such plants cannot be planted deep enough. We want at least from eight to twelve inches of cane. This society owes it to the people of the State to enter a protest against such plants. They cannot be planted with any success, unless by extra care. He moved to recommend not to purchase any grape vines that had not from eight to twelve inches of cane left on them.

Mr. Mudd. I think it would not be wise to pass a resolution upon this point. There is much difference in soil and subsoil in this respect, and there is great difference in varieties, some having a tendency to strike roots down, and others seeking more to the surface. I wish the Doctor would withdraw his motion and not press it at this time.

Mr. Clagett. Many of our most experienced growers are not present. Lay it over so that we can get information on the subject.

Dr. Dyer. When my vines come with more than three inches of cane, I cut them off. I find that my best plants that have succeeded best have stems only three or four inches long.

Mr. Murtfeldt. I know of some of the best cultivators on the Hudson that cut all vines back to two eyes.

Mr. Clagett. What propagators do is not the question.

Dr. Edwards. Far from it, I mean what I say. Every man knows that if you plant a plant too near the surface you will lose the plant. We get plants with roots half as long as my arm, but no cane. Some may wish to plant an inch below, but those who want to plant a foot below should have a chance.

Dr. Dyer. I planted 500 Iona vines one inch below the surface, and 1000 vines cut to about two inches. Some were Norton's; they were all single-eye plants, had good roots, and good success.

Mr. Mudd. This question of planting deserves mature consideration before adopting such general principles as are implied in the resolution. I object to fixing any length, and prefer letting every person decide for himself. Let us take up the planting, if desired, but let this resolution be laid on the table. Adopted.

AFTERNOON SESSION.

Mr. Flagg presented the following partial report upon gallizing:

"I have now come to that tree, I mean the vine, which a great part of the world almost idolizes. I know there have been great disputes among the learned (and positively determined by Mahomet and the Mahometans all over the world), whether it had not been better for mankind it had never existed, considering how much that noble juice hath been abused, and how often it has been the cause of numberless calamities. For my own particular use, I must own it is my opinion that, next to bread, which is the staff of life, it is one of the greatest merely material comforts we in this northern climate enjoy; and having been long thereunto accustomed, when transplanted into a more southern country, we shall hanker after it, and if we cannot have good of our own produce, we shall certainly have recourse to foreigners and purchase it at any rate, and thereby impoverish our infant colony. * *

"Vines of divers sorts and kinds grow naturally in this country. We have already discovered and distinguished five or six sorts very different from each other. * * * It is true some of these grapes, for want of culture, though large as damsons, have great stones and a tough skin, yet they might easily be meliorated by European skill; though as they are, especially two or three of the smaller kinds, are as grateful to the palate as most we have in England; but the very worst, duly managed, produces brandy hardly inferior to any in Europe, so that had we vessels to distill and skillful operators, we might soon abate the price of that liquor in England and our plantations, and keep a sufficient reserve for ourselves.

"And further, when we have once obtained the skill of meliorating grapes, we shall produce not only as good wine but also as good raisins as in most countries of Europe, the climate being admirably adapted thereunto; and thereby not only supply ourselves and neighboring colonies, but somewhat abate the expense of our mother, good Old England, from whom we proceed."

Thus wrote Daniel Coxe a century and a half ago, in his "Description of the English Province of Carolina, by the Spaniards called Florida, and by the French La Louisiana, as also of the great and famous river Meschacetee or Mississippi, the five vast lakes of fresh water and the parts adjacent, together with an account of the commodities of the growth and production of the said province."

The summing up of his argument is, first, that wine, however abused, is a necessary comfort and hardly a luxury of life; second, that if not grown at home it will be imported at great expense from abroad; and third, that good political economy requires us in so favored a land as this to grow our own. All these conclusions the wine growers of the valley of the Mississippi have arrived at.

But the practical questions, which are the best varieties of wine grapes, the best method of making, managing and marketing wines, still remain open, either imperfectly understood or continually subject to revision as times, men, and wines change.

In connection with this branch of the subject of grape culture we have lately fallen out on the subject of adding sugar and water to the must of wine before fermentation, or, to coin a word not authorized by Worcester or Webster, concerning the necessity, policy, and honesty of "gallizing."

Our record.—The first unequivocal expression of the society on this subject occurs in the report of the committee on wines in 1863.

"Wine," the committee say, "we consider the pure fermented juice of the grape without any addition whatever." This report is printed with the transactions, page 10, and may be fairly considered as expressing the views of the society at that time.

In 1864 a resolution was passed separating grape wines and wines from other fruit and assigning them to different committees, but no reference was made to the purity of the grape wines.

In 1865 Dr. Schrœder, of Bloomington, presented some specimens of wines to the Wine Committee for examination, that were obviously not the pure juice of the grape. Sugar had been added to such an extent in some cases as not yet to have been converted into spirit. Before the committee made their report, Dr. Schrœder (on Thursday evening), stated he had made use of the Gall process and had brought up his *must* to the proper standard by the addition of grape sugar. On Friday morning the Wine Committee made their report, in which the fact of sweetening was alluded to, and the subject again brought before the society. The chairman of the Vineyard Committee read a letter from Mr. Engelman, of Mascoutah, (which letter is incorporated in the report of the Vineyard Committee for that year), giving a detailed account of his experience in using the Gall method. This communication, and the views it expressed, were violently denounced by one member of the society, and so far as is now remembered were not supported by any one. It was, on the other hand,

Resolved, That a permanent committee be created, to whom all wines other than those made from the pure juice of the grape shall be referred.

It was not until 1866 that any difference of opinion on the subject was expressed by many of the society. Several prominent members of the society then gave a qualified assent to gallizing as a necessary process in years of inferior fruit. No action, however, was taken on the subject. In 1867 the subject was again brought before the society in the shape of a resolution expressing disapproval of gallizing. It was laid on the table.

The position of the society, as we then stood, remained adverse to gallizing, but a committee was appointed to report on the gallizing process.

Having corresponded with the members of the committee, and with gentlemen in wine-growing districts in different parts of the West, I submit such information as I have gathered together rather as a report of progress than as definite conclusions, and rather as my own views, so far as I give an opinion, than as the views of the committee. In fact, I may add that several of the committee have already taken such ground, *pro* and *con*, in this controversy as renders them unwilling to sit in judgment on a case upon which they have already expressed a decided opinion.

European practices.—Whether the practice be reprehensible or not, it seems a fact that European wines are now very generally changed from their normal condition by the addition of foreign substances.

The translation of a part of Dr. Ludwig Gall's "Practical Guide," etc., given in the Patent Office Report for 1860, enumerates a long list of investigators and experimenters in the improvement of wine, showing that a general desire for something more profitable than the ordinary vintages had long existed in France and Germany.

Faraszthy, in his "Grape Culture," etc., states that at Hockheim he found imitations of champagnes that were better than the originals. Such adepts have our trans-Atlantic brethren become in the manufacture of wines. In the appendix of the same work Dr. Gall's views are given at length, and statistics are also given that show how extensively they have prevailed. George Wilkes, in his editorial correspondence from Europe the past season, mentions "the extraordinary fact that a bronze medal had been awarded to a French firm by a jury of the Exposition for imitation wines. While another firm has received an honorable mention for a collection *de vins imites*." Mr. Wilkes thereupon continues as follows: "Ably written articles in the Paris press, commenting upon these singular prizes, and also upon an award of a gold medal, by the National Assembly, to a certain manufacturer for his *liquer essentialle de Cognac*, have thrown a great deal of light upon the mystery of adulterating vinous and spirituous drinks; so that the *ci-devant* connoisseurs, who thought they knew everything about such matters, are becoming very muddled, and at the same time very sensitive upon the subject. So far as I have been able to ascertain, however, these adulterations are practiced mainly upon brandies and red wines, the colors of which afford a facility for innovation, and the flavors of which, moreover, are not usually so fine as to be in fear of reinforcement. Champagne, on the contrary, from its greater delicacy, is not so amenable to tampering."

One of the most favorite methods of "aging" and "bonifying" wines and brandies, is by mixing with them a preparation from green walnut shells. These are said to possess remarkable properties for the purpose, and, as the infusion is declared to be entirely wholesome, the process is defended as being unobjectionable. It is simply, as the defenders of the manufacturers declare, the adding of the necessary seasoning to a good beefsteak. The most startling feature of these statements is that these adulterations are made at the homes of these wines, and are applied by the great Bordeaux manufacturers themselves.

In Portugal, also, as recent developments have shown, a general method of "doctoring" port wine prevails, and the most singular feature of this revelation is, that the port for the English market has been more universally subjected to this mode of reinforcement than that for any other place. This exposure comes from the British secretary of legation in Portugal, who gravely informs his government that "all port wine exported for the English market is composed quite as much of elderberries as of grapes;" and he adds that, in addition to this fraud, the wine is then heavily dosed with brandy, to suit the English palate.

These statements caused a great panic among the London port wine merchants, and, apprehending the destruction of their trade, they employed the English consul at Oporto to endeavor to controvert the ruinous development. That gentleman consequently denies the universal use of the elderberry in the making of port wine, but justifies the use of brandy with the argument that "all other wines are no better than disparaged port in this respect." "In fact," concludes the consul, warming under the inspiration of his fee, "a fine port may be considered as a work of art as well as a production of nature!"

Our elder brethren therefore are arriving at what we may regard as the ultimate conclusion in the case, though going further than many here would now allow, viz: *That it makes no difference how or of what a wine is made, provided it be as healthful and agreeable as the wine imitated.*

It will, of course, be denied that it is possible to produce an artificial wine which shall have all the desirable points of a first class pure wine, but right here must be the discussion, which I leave in the hands of those more competent to speak upon the subject.

The views of our wine growers.—I submit here the views of correspondents for the consideration of the society:

George Husmann, of Hermann, gives the following points as embodying his views on the subject:

1. "If in indifferent seasons, or even in good seasons, the manufacturer of wine adds to his *must* only such substances as it naturally contains, and by so doing ameliorates the acidity and flavor of the must and adds to its body, it is not an adulteration, but an improvement.

2. "If, by so doing, he improves the quality of the wine, making it more palatable and more conducive to health, he should be considered in the light of a benefactor of mankind, instead of an impostor.

3. "If the opposers of the system will not accept of the most stringent tests offered to them, and will neither take the pains to investigate, nor bring any good and tangible reasons why they call it adulteration, their simply calling it such and pandering to an old prejudice should have no weight with sensible and thinking men, and is to be considered as an insult to the good sense of the community.

4. "Every one at all familiar with the manufacture of wine in France

and Germany knows that only since the general introduction of the methods of Gall, Chaptal, and Petiot foreign wines have become so abundant and so generally palatable, as they now are; and only since that time has the product of poor seasons become fit for the market. If we do not adopt the same principle here, we will not be able to compete with them, and wine will never become the universal and cheap beverage of all classes. The greatest authorities on wine making and chemistry, Babo, Liebig, etc., have pronounced in its favor, and their opinions should have more weight than the assertions of ignorant persons, unsupported as they are by any arguments, and unwilling as they seem to be to accept of any tests, even when they are all in their favor."

The Messrs. Koepfli, of Highland, Ill., who have been engaged in wine making at that place since 1847, as I learn through the kindness of Otto Brodtbeck, of that place, "have never experimented on improving the wine, and keep it only as it comes pure from the press. But I find that all connoisseurs of wine agree that all Catawba in its natural state is too strong, and contains too much acid, and is therefore not a very healthy beverage, and likely to produce dyspepsia if used to excess; while on the other hand the Catawba gallized is a very pleasant and light beverage, and can be produced cheaper than the imported German wines, and therefore I believe will come into more general use."

At Warsaw, Ill., wine has been made pure until the present season, when some grapes that did not ripen well had sugar added.

Theodore Engelman, of Mascoutah, Ill., whose views on this subject I have before had occasion to introduce to this society, and a gentleman whose accurate observations and impartial love of truth entitle his views to more than ordinary consideration, sends me the following interesting notes, which I give, without any apology, in full.

Remarks on the Treatment of Wine and on Gallizing.—Wine is the fermented juice of the grape.

Good dry wine contains—

1. From eight to fourteen per cent. of alcohol.
2. From four to six per mil. 4-1000 to 6-1000 acids.
3. A *trace* of sugar, say from one-half to one and a half per cent.
4. From two to three per cent. of other vegetable (insoluble) substances.
5. The balance, say from eighty to eighty-nine per cent., is water.

To obtain such wine, the juice of the grape, before fermentation (the must), must contain—

1. From sixteen to twenty-eight per cent. of saccharine matter.
2. From five to eight per mil. of acids (tartaric).
3. The balance, say from seventy to eighty per cent., is water and other vegetable mucus substances.*

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* This analysis may be very objectionable to the chemist; it is sufficient to the wine grower.

By the process of fermentation the sugar or saccharine matter is converted into alcohol, and the mucus substances are separated in the form of lees, and it is the business and the aim of the wine grower to see to it that it is done thoroughly and effectually. The health and the quality of the wine depend on it, and according to the treatment generally adopted, and according to the present state of experiences, it will take at least one and generally two years before this is attained and the wine brought up to the standard above given.

In further explanation of what has been said, it may be proper to remark that eight per cent. of alcohol will be sour, with six per mil. of acids, while it may be very pleasant with four or four and a half per mil. of acids. A wine of twelve per cent., or even fourteen per cent., of alcohol may be a superior article with six or seven per mil. of acids; the former will not have more than a *trace* of sugar, while the latter may have one and a half per cent. of it. The different component parts of the wine must be present in it, in proper proportions, and must be well balanced.

Having established the standard of good dry wine, and pointed out the material of and the process by which it is obtained, the next and most important question which presents itself for solution is, whether or not we have the climate and the grape to warrant success. Without participating in the extravagant opinions which have been advanced by visionary writers as established facts, it is safe to say that this country has been as much favored by a kind Providence as Europe.

In Europe the grape crop is far from being a safe and sure one; failures are of frequent occurrence, and there is a wide and material difference in the quantity and quality of the wine obtained in the same locality in each year. So it is, and so it will be here, in all probability. Even in Europe, where the wine growers have thousands of years of experience before them as a guide for their labors in the vineyard and cellar, the rules of proceeding are by no means permanently or unchangeably fixed; they vary not only in different countries, but also in adjacent and closely connected neighborhoods, and they are subject to constant changes, as experience or science appear to point out new and better modes of treatment.

Still less can we expect to be able to lay down such permanent rules, here in the United States of America, where this interesting and important branch of agriculture is yet in its infancy; where comparatively but few persons are engaged in it, whose experience is of recent date, only made within the last decennary, and is confined to a few localities and to a few varieties of grapes, and is therefore uncertain and defective. The writer of these lines is well aware of this, and it is with great reluctance and diffidence that he undertakes to lay down here what little experience he may have collected, and the conclusions to which he may have arrived.

The conviction only that a frequent interchange of these experiences and conclusions is necessary to the advancement and development of this branch of industry, could induce him to relinquish, for a moment, the cherished obscurity in which he lives.

This feeling is the more intense, as he knows that the rules which he is about to lay down for the treatment of our wines, as the result of his experience during a number of years, will meet in some quarters decided opposition and condemnation. He desires to keep out of unpleasant controversies; but, conscious that he has treated the subject carefully and without prejudice, he proceeds.

The Catawba, Norton, Herbemont, and Concord are extensively cultivated in his vineyard, and wine has been made of them in more or less quantities; to them his experience is confined.

These are fair representatives of the American grapes, and what may be said of them may be applied to others. The Norton and Herbemont are healthy vines, and they ripen their fruit to comparative perfection even in less congenial years; yet, the Herbemont is a late ripening grape, attaining its perfection not before the end of October or beginning of November, and requires a corresponding late fall. The Catawba, being more tender and more liable to the diseases of the vines, ripens its fruit unevenly, so that in the most favorable years a selection of the perfect and the imperfect fruit, and a separation of them, is advisable. The juice of the selected perfect fruit will be fully within the standard laid down at the beginning of this article. It will contain generally from 20 to 22 per cent. of sugar, and 6 to 7½ per mil. of acids, and will make a very good light-colored wine after it has undergone a healthy, uninterrupted fermentation. The fermentation will precipitate with the *lees* 1 to 1½ per mil. of acid, and leave in the ripe wine the alcohol and the acids in proper proportions.

So far we all agree; but now the question arises, on which the opinions differ so much, What shall be done with the grapes which in their juice do not present the requisites of a palatable or salable wine—which are either deficient in sugar or contain an excess of acids, or both? Shall we discontinue their cultivation, or shall we, by a simple and natural process, regulate the defect, which nature has failed to correct? If we adopt the first alternative, wine growing ceases to be, at least for the present, a branch of American industry. We have only a few grapes which, in favorable seasons and in congenial situations, warrant a good article of wine; and we do not yet know whether these favorable seasons will be frequent or few and far between; and it would be interesting to ascertain, whether in those happy spots where the grape diseases are not or but little known, as on the islands in Lake Erie, and in Hancock and the adjoining counties in Illinois, the juice of the grape is rich enough to make good wine according to the adopted standard; samples which the writer has tasted justify a doubt.

If, to the contrary, we adopt the other alternative, we at once have a great variety of wines of unexceptional quality, which can fairly and successfully challenge foreign competition.

The simple and natural process referred to is "gallizing," that is, adding to the juice of the grape sugar and water in sufficient quantities to bring the *must* up to the adopted standard. It cannot be insisted that sugar and water are substances foreign to the juice of the grape; we know already that they form nine-tenths of its component parts; and we may also know, if we have taken an interest in the investigation of the subject, that the gallized wine cannot be distinguished from the wine of the pure juice; neither the chemist, by the aid of his science in its present state of perfection, nor the tippler, whose organs of smell and taste are kept sharpened by constant use, are able to point out a distinction.

Great efforts have been and are constantly being made to create a prejudice against gallizing, and to condemn it; but no plausible reason for such opposition has ever been advanced. To call it adulteration is no argument, as long as no distinction can be established; and the only and last argument, that gallized wine will not keep, proves nothing except the ignorance of the asserter. Gallized wine will sooner clear and become bright and transparent than the wine of the pure juice, and is less subject to the diseases which threaten the latter. The cause of these diseases, and the enemy of the longevity of the wine, are the mucus substances in the must, which, by the fermentation, are separated and precipitated in the form of lees. If the fermentation is interrupted by a sudden change of temperature from warm to cold, or is otherwise imperfect, part of those substances remain dissolved in the wine and impair its health and longevity. These impurities are present in the gallized wine in less quantities or proportions than in the wine of the pure juice, and this is the reason why the former clears faster, is more healthy, and keeps fully as well as the latter. A certain amount of alcohol, and freedom from impurities, are the conditions of the longevity of the wine.

From the foregoing the following may be condensed as the rules for the treatment of our wines:

1. At each vintage the must of each variety of grape ought to be carefully examined, and the proportions of sugar and acids present in it exactly ascertained. For this purpose certain instruments are necessary, and the knowledge how to use them.

2. If upon such examination the must proves to contain sugar and acids in sufficient quantities, and in proper proportions, gallizing is not advisable. If there is a marked difference in the perfection of the grapes, a selection of the ripest fruit ought to be made, if its juice promises good wine without gallizing.

3. When gallizing is resorted to, it ought to be done with a view to the improvement of the quality, and not an increase of the quantity of the wine.

4. Do not try to make a superior article of wine from very inferior must. Be satisfied to make good wine of it.

5. Do not add more sugar to the must than the ferment in it can master and convert into alcohol. If sugar in any quantity (more than from half to one and half per cent.) remains dissolved in the wine, it will impair its health, or the wine will lose its character as a dry wine, and enter the list of sweet or *liqueur* wines.

6. Do not try to make better wine than nature is able to make of the same variety of grape under most favorable circumstances.

Try to imitate nature, not to outdo her. Here these remarks might close. They tread a narrow spot of a wide field but imperfectly explored.

It may, however, not be unprofitable, before parting, to throw a glance at those countries from which most of the wines consumed in the United States, and which enter in so formidable competition with the native product, are imported. Let us look into France and Germany, and see how these wines are made.

In France the practice of adding sugar to inferior must prevailed in the last century, and became more generally known and adopted at the beginning of the present century, after Chaptal (in 1801) had published a treatise on the treatment of wine, recommending the addition of sugar to inferior must.

In the southern provinces of France, where at some vintages they found an excess of sugar in their must, they used to add water to the must, experience having taught them that they secured a more healthy fermentation, and the better development of the finest qualities of the wine. After Chaptal, France had many writers on the proper treatment of wine, all recommending artificial improvement of the must in inferior years or localities, and quite a literature on that subject was formed, the perusal of which would be very beneficial to the advocates of the pure juice. The adding of sugar to the must remained known, and was and still is extensively practiced in France and Germany by the name of "Chaptalizing."

In 1854, Petiot (Petiot de Chamirey, one of the largest wine growers in Burgundy) published an article on his treatment of red wines, in which he claimed that not only the quality of the wine could be improved, but that its quantity could be increased four or five times (400 or 500 per cent.) by the repeated additions of water and sugar to the skins and seeds of the grape. Petiot's mode of wine making was received and looked upon with great favor, not only by the wine growers, but also by the government of France, and was readily adopted and imitated, and is now known by the name of "petiotizing." To this process, in all probability, we are indebted for the cheap claret wines which clog our market, while it is well known that the most costly French wines which we use are prepared for the American market by an abundant dose of brandy, "to give them *body* and suit them to the American taste."

In Germany the practice of bettering the *must* by the use of sugar was not generally known before the middle of the present century although there is good reason to suppose that it was followed there as early as in France, but was the "cellar secret" of the large wine growers and dealers in the article, who used to buy the must of the small vintagers. This was a source of wealth, and was looked upon as their exclusive privilege. They knew better than the more talkative Frenchmen how to keep their secrets, and when "chaptalizing," and later, "gallizing," became more generally known and adopted, they were and still are the uncompromising opponents of it, recognizing in it what they consider an infringement of their vested rights. Yet the practice gained ground in spite of their opposition, owing to the efforts of more patriotic and disinterested wine growers, aided by the most prominent chemists and other scientific men of both France and Germany, and may now be considered as universally adopted. Gall is not the inventor of this treatment of wine; his merit consists in having brought system into it, and in having pointed out to the wine grower a method by which he can produce the same article of wine with almost chemical accuracy from year to year. Before that time quite a number of secret remedies were in use to neutralize part of the acids in sour wine, as chalk, lime, potassa, etc. These can be dispensed with now. The sour wines have disappeared, and have made room for a pleasant, wholesome beverage! The battle has been fought in Germany and France, and has been won. Shall we fight it over again here?

In proof of the assertion that gallizing has become universally adopted in Germany, the following statistics may be referred to: The first establishment for the manufacture of grape sugar (from potato starch) was erected in imitation of those in France in 1849. Other similar establishments soon followed, and their number and capacity increased from year to year, so that in 1860 (later dates are not at hand) not less than seventeen large manufactories were in successful operation; and if verbal information from reliable sources is correct, their number has in the meantime been doubled.

In Europe extensive establishments exist for the manufacture of wine without grapes, and it is said that it is quite difficult, if not impossible, to distinguish it from grape wine. It is a well known fact that not only dyestuffs, to give the wine any desired color, but also substances, or oils, to give it any desired *bouquet* and aroma, are common articles of commerce, to be found in almost any drug store; and that such establishments exist in the United States is more than probable. If we refer to the report of a commission appointed in 1865 by the Congress of the United States, for a revision of the revenue system, on page 164 we find that in the city of New York alone, by four firms, in one year, 1863, not less than 225,000 gallons of alcohol were used in the manufacture of "*imitation wines.*"

M. B. Bateham, of Painesville, O., Secretary of the Lake Shore Grape Growers' Association, says: "Our society has persistently and emphatically opposed all doctoring or gallizing of wines, believing it to be an injury to the public, hence morally wrong; and also unwise as a matter of policy, as our aim should be to build up a high and lasting reputation for our native wines, for *purity and healthfulness*, which will more than compensate for any loss which a few individuals may sustain by refusing to practice the arts referred to. We hope that your committee and society will place yourselves firmly on the right ground in this matter. I think our society will give more distinct utterance on the subject at its next annual meeting in February."

Mr. Bateham incloses a premium list of the association, showing that premiums are offered only for wine without the admixture of sugar, and adds: "All sweetened or doctored wines are excluded from competition, excepting the 'sparkling.'"

Dr. John A. Warder, of Cincinnati, says: "Our people are violently opposed to it," (gallizing) and refers to the report of the committee on red wines, etc., published in the Journal of Agriculture, for his own views. As most of those interested have read this I need only refer to it.

E. H. Burgess, of Hammondsport, N. Y., says: "I have taken some pains to talk with our wine men in regard to 'gallizing,' and find that all, without any exception, condemn it, in theory at least. Some varieties of grapes, it seems, will not make a salable wine without addition. It seems to be the aim of all our grape growers to find the grape that will produce a first-class wine without any addition whatever. The Catawba, Isabella, Concord, and kindred varieties will not answer the purpose, and at the same time suit the taste of the American wine drinkers. The Iona promises better results to the winemaker than anything else that has been tried.

"The small quantities that have been made show a very great superiority over all others. While not much stronger in alcohol than the Delaware, it has far more character, and retains a fruity flavor that is entirely wanting in the Delaware. Still it is not fully demonstrated that we shall be able to secure good crops of the Iona.

"Thus far it has been perfectly free from disease, but its bearing quality yet remains to be tested.

"That we shall in time have a grape which will make a wine equal to the best of European varieties, I do not doubt. That we can make such a wine from any of our known varieties, I do not believe."

These are the opinions that the chairman of your committee has at present to communicate. It will be noticed that they are contradictory, and, to a certain extent, rather dogmatical than logical. One states that pure Catawba is too acid to be healthful; another assumes that pure wine is necessarily healthful, and gallizing not so.

Dr. Warder, in his report upon red wines, seems to think that spirit derived from sugar and water may not be as healthful as that from the grape juice, while Mr. Engelman, in the Journal of Agriculture, appears to imply it may make no difference, and so on.

Addendum.—On all great moral questions like this disputants are in the habit of making an ultimate appeal to the Bible.

"Hic est liber in quo querit, sua dogmata quisque Pariter invenit sua dogmata quisque."

The opponents of gallizing will read with unction the following:

"Thou didst drink the pure blood of the grape."

"Their grapes are grapes of gall; their clusters are bitter; their wine is the poison of dragons, and the cruel venom of asps."—Deut., XXXII.

"Thy silver has become dross; thy wine mixed with water."—Isaiah, I, 22.

"Behold, I will * * * make them drink the water of gall; for from the prophets of Jerusalem is profaneness gone forth into all the land."—Jer., XXIII, 15.

The friends of gallizing, on the other hand, refer to the miracle of the water made wine as pre-eminent authority, showing that under the new dispensation the prejudices in favor of pure wine were done away with, and that wine made of water was found better than the other.

The society, without indorsing the views presented in the foregoing report, ordered it to be published among the proceedings.

Mr. Eliot. I would recommend the pure juice of the grape.

Mr. Husmann. I will state a fact. In correspondence with M. Lewis, of Sandusky, I sent him some samples of wine which he took to the State Horticultural Society; on the wine committee were Dr. Warder, Eliot, Campbell, Meehan, and Bateman, most of them opposed to gallized wine. They had Werk's best Catawba, which was considered equal to any Ohio wines. It was rated on a scale of 100, at 801-14; my sample of Catawba was rated at 824-11, and my Nortons at 96.

Mr. Lewis said they were all taken aback when he stated who made them. These wines were gallized. As to gallized wines giving headache, he did not think so.

Mr. Bush. This is all nonsense.

Mr. Husmann. If I get more money for my gallized wine than for my pure juice, I will take it.

An essay on transplanting vines and trees, and the care of them during the first year, was then read by Mr. J. M. Jordan:

In presenting this paper I would not pretend to teach those who have had many years of experience, and whose success has rewarded them. But we have the tyros among us who are just starting, and their ideas have been raised to a high point by reading the reports of those who claim large fortunes with but little expense, and if I can assist those new beginners to so plant, cultivate, and prune that success may also reward them, I shall realize my expectation. I shall not endeavor to elucidate, but give broad assertions of what I deem to be facts, knowing there are those here who differ from me, and the discussions that will follow may be of much value to us. Trees and vines are best planted in the fall; trees at the age of one and two years and vines at one year. But the vines should be an independent organized plant; those most likely to be so are those grown from short cutting in the open ground. The first winter after planting, the earth should be raised around all newly planted stock and covered with anything to prevent the frost getting at the roots. Prune in the spring just before the plant begins to grow. What is generally known as mulching, covering the ground in the summer with straw, leaves and the like, to prevent the ground from drying, I consider injurious in most cases. Clean culture, stirring the surface at least every week, will save most plants. No man should complain of plants dying, when he cannot find the moist soil within three inches of the surface. Three-fourths of the trees and vines that die before coming to maturity die the first year after planting, hence the great importance of extra care the first season after planting. Manure in the holes, coming in close contact with the newly formed roots, is very injurious. Trees and vines should not be summer-pruned, as the growth can be directed by pinching the end shoots or removing the buds that are not wanted.

Insects are very apt to attack the first year after planting, and much care should be taken in destroying our enemies, for fear we also kill our friends.

Cherry, peach, dwarf pear, and half standard apple should be headed from three to three and a half feet high. We cannot be too explicit in recommending the best plants for setting. A No. 2 plant is not worth ground room in an orchard or vineyard, and the way to decide the merits of plants is to see them. We should endeavor to plant trees and vines propagated from bearing plants, as they will bear sooner than those propagated from young plants.

J. M. JORDAN.

The committee on fruits on exhibition presented the following

REPORT.

Apples exhibited by Thomas R. Allen, of Missouri: Smith's cider, handsome specimens; rambo, good; Esopus Spitzenberg, small; Michael Henry pippin, very good; Rawles' janet, very good; Newtown pippin, good, but stained by growing in black soil; Ortley, small; Pennock, small; Wagoner, small; Rome beauty, good; winesap, fine; limber twig, Pennsylvania redstreak, and one unknown.

By R. Barron, of Missouri: Pennsylvania redstreak, Lansingburg (sweet); Long green pippin, Newtown pippin, good; White winter pearmain, good, and one unknown.

By Amos P. Sawyer, of Illinois: White winter pearmain, and an unknown variety of winter pears of very good quality; a promising variety, about which more should be known.

By Dr. H. Claggett, of Missouri: Long green pippin.

By Pike County Horticultural Society of Missouri: Ortley, very fine; Newark pippin, good; Vandervere (streaked); Baldwin, very good; American golden russet, unusually large; Roxbury russet, very good; white winter pearmain, very good; Fallowater, McAfee's red, a good apple; rambo, very fine; Tompkins county king, fine; Esopus Spitzenberg, good; Newtown pippin, large and well grown; Newtown Spitzenberg; Rome beauty, very good; Vandervere pippin, Wagoner, incorrectly; Pennsylvania redstreak, Rawles' janet, splendid specimens; Rhode Island greening, very good; Pryor's red, very good; winesap, willow twig, Pennock, winter queen, incorrectly; one unknown variety, a red crab, and very superior specimens of the Osage orange.

By Dr. R. Bircher: Lady apple, very fine.

By William Patrick, of Indiana: Northern spy, Rome beauty, winesap, Ben Davis, Smith's cider, white pippin, Newtown pippin, Milliken sweet, Baldwin, Vandervere pippin, Porter, incorrectly.

This collection of apples, from Terre Haute, Indiana, were good, sound, well-grown specimens, conclusively showing the adaptability of that section of country for the production of the apple.

By E. Y. Teas, of Richmond, Indiana: White winter pearmain, Rome beauty, Belmont (a good specimen of an excellent apple), Michael Henry pippin, Rawle's janet, Crook's seedling, nonpareil (incorrect), Pryor's red, winter queen, winesap, Detroit black, Baldwin, Haskell's sweet, Westfield seek-no-further, Michael Henry pippin, Ortley, summer belleflower (incorrectly), Henwood (incorrectly).

The last two varieties are, in the opinion of the committee, identical with the next before it, Ortley.

Smith's cider, Roxbury russet, Ben Davis, Rome beauty, Pennock, Newtown pippin.

Red sweet pippin, incorrectly. This is Moore's sweet.

Winesap, Jersey black, sweet maiden's blush, sweet crab, northern spy, Virginia greening, Bentley's sweet, president.

Hoosier's red. This is the Ashmore, and old variety.

English red steak, incorrectly.

Aunt, red Canada, Nickajack, Dutch mignonne, twenty-ounce pippin.

By George S. Park, of Parkville, Missouri: Large striped pearmain.

By L. and J. Reed, Missouri: Pennock.

By H. M. Voris and Mr. Stone, of St. Joseph, Missouri: Ortley, very good; Porter, very large; Esopus Spitzenberg, good; Kentucky red, Baldwin (incorrectly, committee called it Newtown Spitzenberg), winter redstreak, northern spy, Rawle's janet, very fine; white winter pearmain, splendid; one unknown.

This and the collection from Pike county were of remarkable excellence.

Three samples were received from William Colnel, of Sparta, Illinois, two of which were seedlings, and the other unknown.

J. M. Jordan laid upon the table two fine specimens of the Doyenne d'Alencon pears, an early winter variety.

C. W. SPALDING, *Chairman.*

Mr. Eliot. I would ask Mr. Husmann if he does not look forward to our finding a seedling grape that will make wine without sugar?

Mr. Husmann. All our native grapes will make wine, but we want some mode of diluting the predominant acid and pungent aroma. Some of our native varieties run as high as 100°. I think there are great mistakes as to where the fault in our native grapes lies. A great mistake is in the idea that nature makes the wine. She gives us the juices in the grape, out of which we have to make the wine. The juice, as it comes from nature, is not wine.

Mr. Murtfeldt. One great mistake in growers is they think the same grape will invariably produce the same results in all localities and in all seasons. Persons find so much more profit in the marketing of plants and introducing new varieties that they have not time to give to the manufacture of wine. In Germany those wines of high repute, as the Hockheim, Steinberg, Frauensmilch, etc., are confined to small localities. We expect to find the same varieties succeed and make the same wines in Missouri, and Iowa, at Cincinnati, and Warsaw, and Hermann. We must aim in producing a beverage for "the people." We must cultivate the varieties best adapted to the several localities, and sell at a low figure, so as to come in universal use.

Mr. Husmann. Nature gives us the juice; still we have to help it. If we put it in too cold a place, we kill it; it will not ferment. If too warm, it becomes vinegar. We must keep it in just the heat the *must* will bear to induce healthy fermentation and make wine.

Dr. Claggett. I would like to have the best method of planting grape vines taken up. This question of planting, and the condition of vines, are closely connected. Those small plants cut back to two eyes are unfit to plant in the vineyard. It may do to set them out in the nursery, and grow them another year. A vine cannot be planted right, in my opinion, unless it has six to ten inches of cane to keep its roots from the light. If it starts roots above, it goes itself, after it has made its rootlets, to obtain its nourishment below. If the cane is left too long, we can cut it off to suit. We don't want the nurserymen to cut off all the cane and make new plants out of it at the expense of the buyer.

Mr. Jordan. I would put the vines where they can get food to feed upon. I planted my vines six inches deep in subsoil clay, and they have done well, and yielded large crops.

Mr. Husmann. I deepen the subsoil 15 to 18 inches deep, and plant 8 inches deep, and have had the best success. The depth of planting should depend upon the subsoil. If the soil is light and sandy, plant deep—if a tenacious soil, plant shallow; 6 to 8 or 8 to 10 inches will be called medium planting. As to cutting of the vines as short as some, I do not recommend it. I think that for the few eyes they can steal they often ruin the vine; the eyes are often worth more to them than the root.

Mr. Peyton. I set out cuttings in the vineyard, and in two years and a half had grapes on them. I set out the cuttings 16 to 20 inches, and planted them 3x5 feet. I find the good roots are at the bottom.

Dr Spalding. Deep and shallow planting are relative terms. Soils that will not admit of planting 8 to 10 inches deep should be made so. I am planting on land naturally underdrained, underlain by rock. full of seams and openings. water stands in holes only a few hours, subsoil clay, but not tenacious. In such soil I plant 10 to 12 inches deep. In tenacious soils this depth will not do—planting never pays in these tenacious clays; it must be worked 20 to 24 inches deep, and rubbish or material thrown in to free it; doing which, will certainly put it in "drain tile." The roots must go deep some way. If you thus prepare the ground thoroughly you get them in earlier than otherwise. You can hardly take up all the roots of a vine under 5 to 7 feet deep. I saw them at the Alton bluffs. Near to the corner of the vineyard the clay was 7 to 8 feet deep, and then sand, and the roots went down to this. If the roots are cut off in this very condemnatory way you will not find so good results. The wine-growing interest is not going to pay and beg, too, in regard to this question. We cannot devote too much time to this question. Vines will grow in most soils, and give good returns; but if you prepare well it will give better returns. The soil and climate cannot be questioned. I think we can illustrate this more fully at a future time. I am an advocate of deep planting—that is, 8 to 12 inches; shallow planting I call from 2 to 6 inches. I met a gentleman in Cincinnati who was planting single eyes trimmed down; he recommended shallow planting; he put them in very carefully, 2 to 3 inches deep, and tended them well; the next winter there was much freezing and thawing, and in spring he found them thrown out. He said, "I wish I had known this fact before I planted out six acres in Delawares."

Mr. Claggett. This is of great importance in planting out a vineyard. A gentleman well known got a vineyard planted out in this way; they did so poorly that he set to work and took them up and planted them deep, and they did well. All the facts I have been able to gather go to show that deep planting is best.

Dr. Edwards. I am glad that other gentlemen's observations confirm my experiences from my own planting, both shallow and deep, and we cannot set those vines deep that have canes only one or two inches long. Those vines that make only six to eight inches of cane cannot have good, ripe roots. If we say we will not buy unless the vines have six to ten inches of stem, propagators, being desirous to sell, will give us them, and we will have fewer failures. I hope we will give notice to propagators that we will not buy such plants.

Mr. Husmann. There is a great distinction between what we call deep planting and planting six to eight inches deep. We got the idea from Germany and France that roots should be planted eighteen inches to two feet below the surface of the soil. In adopting this course the plant did not strike out well. Some have tried to correct this, and gone into the opposite extreme and planted only two inches deep. Propagators availed themselves of this and cut back the vines to two eyes. We must see that we don't adopt the extreme of the planting of former days.

Dr. Edwards. Men rely on this society for information on this subject. It seems we are one in recommending from six to twelve inches, according to the nature of the soil. We should now "resolve that we purchase no grape vines that will not allow of being planted from six to eight inches deep." Adopted.

Mr. Murtfeldt read a preamble and resolutions on appointing a State entomologist (the original of which we failed to obtain—SEC.), which led to considerable discussion.

Dr. Morse. I don't think the matter is in the proper shape. The Legislature do not know anything about the proper person for this office. The nominating power should be somewhere else. It is not quite the thing that he should be independent of all these institutions.

Mr. Murtfeldt. I suggested the matter in order to have it brought before the Legislature. I think he may be nominated by the university, and with other bodies by concurrence. I have been waiting to hear what members would say on that. What I suggest as wanted, is that he be independent in his action.

Dr. Edwards. It is not our place to do any more than ask the Legislature for the officer. They have the power, and no one else. We may accomplish nothing in the matter by trying to accomplish too much. I move that the matter be referred to a committee, to report during this meeting. Adopted.

Dr. Morse, Mr. C. W. Murtfeldt, and Professor Swallow were appointed said committee.

Report on entomology called for.

Professor Swallow. I am not the chairman and prepared no report.

Mr. Claggett. I move that the subject of entomology be taken up to-morrow morning. Adopted.

On motion of Professor Swallow, it was

Resolved, That our legislators be requested to give this society a representation in the State Board of Agriculture, on the same basis as the agricultural and mechanical associations.

Mr. Husmann. I move to amend by adding, and the president of the Mississippi Valley Grape Growers' Association.

Dr. Edwards. If we ask more than this we may kill it. Original motion adopted.

A desultory discussion was had on the subject for the evening session, when

Professor Swallow moved that the time of the next annual meeting be changed to the third Tuesday in November, and that it be laid on the table. Adopted.

Adjourned.

EVENING SESSION.

The President announced the cherry, pear, and apple.

The subject of cherries was then taken up.

Professor Swallow introduced black Tartarian.

Dr. Morse. It is a tender fruit.

Mr. Stark. It does as well as any of the family, and is best budded on native morello stock.

Mr. Riehl. It is one of the best black sweet cherries, productive and profitable for market.

Mr. Kennedy. It is subject to disease. Adopted.

Mr. Henwood. I have cultivated May duke for fifteen years, and find it very good.

Mr. Stark. It is one of the most valuable.

Mr. President. A borer has attacked my trees. Adopted.

The early May was adopted, and the yellow Spanish rejected.

Mr. Riehl. The Gridley is large, with solid flesh, and carries well to market, and there is more money in it than in any other of the class.

Mr. Eliot. English morello is very good, and we cannot get along without it.

Professor Swallow. I keep it for the birds.

Mr. Riehl. It should be understood that these sweet cherries will not do to plant in every part of the State. In those few spots we want the Napoleon. If I plant one it would be the Gridley—two, the Napoleon.

Mr. Allen. Our recommendation should go out with a qualification. The Secretary should be instructed to add a qualification to the list.

Mr. Stark. I think it nearly worthless on the morello stock.

Resolved, That the heart and bigarean cherries are generally tender in our State. Adopted.

Mr. Kennedy called up the belle de choisy.

Mr. Riehl. It is so tender and nice you cannot carry or ship it to market.

Professor Swallow. I would rather have it than any other we have.

Mr. Stark. It does not bear very full crops. Fruit fine; is raised so as to make a fine tree by budding on the morello stock. It keeps pace well with the stock in its growth. It is one of the best we have. In cherries it is what the Delaware is among grapes.

Mr. Kennedy. I budded some on the Mahaleb, and think it produces better than on the morello. It makes a fine dwarf. Adopted.

Mr. Kennedy. Black eagle grows side by side with the others. It is the best of the heart varieties, and more productive.

The Secretary. The best tree of fourteen of this variety failed.

Mr. Kennedy. The cherry would do better if the knife was less used. The buds that come out upon the stem should be left on to protect it. These furnish a shelter to the stem. Low stems are essential.

Mr. Riehl. I am sorry Dr. Hull is not here; he has gone through this same course. The stem needs protection—but it is in winter when these heads give but little shade. The sap freezes and thaws, and bursts the vessels in the inner bark; but we have a little insect called the curculio which infests our cherry trees, and the low heads do not allow the using of the "curculio catcher," and we lose the fruit. I would not start the head lower than three and a half or four feet from the ground. If you will plant them shade the stem and put the tree upon dry soil.

Mr. Stark. I think that low heads give considerable shelter to the stems. I am in favor of rather low heads. The knife should seldom be used except in early spring, and never in summer. I also whitewash.

Mr. Kennedy. I think the leaves are better than the brush and knife. I keep the knife in the pocket.

Mr. Riehl. Dr. Hull planted an orchard upon this principle, and all are gone. I don't know the stock, but I think it was Mahaleb.

Mr. Kennedy. I refer to the buds on the stems. They form little spurs only, and shelter the stem in summer.

Mr. Riehl. The Howell pear is large and better than Bartlett. It is a strong grower, has good shape, good head, and is in every way desirable.

It was agreed to call up the list.

Doyenne, D'Ete, and Beurre Giffard were adopted.

Madaleine was stricken off.

Mr. Riehl. The white Doyenne cracks in the East and has commenced to crack here.

Mr. Swallow. It is a good pear. I have planted twenty varieties, and I think the fruit and tree better than any other.

Mr. Kennedy. It is very productive and good.

The former list of apricots was adopted.

Mr. Stark. I would never plant a nectarine.

Mr. Riehl. It is a peach without down, and will do for those who plant it for money. It will pay for the extra care for market, and it will do to grow them.

Mr. Stark. It is harder to raise than a peach and no better—I don't think it is as good.

Mr. Riehl. There is nothing that the curculio likes as well as the nectarine. It will pay to plant it in order to catch the curculio. List adopted.

The plum list, after adding the Washington, was adopted.

The apple list was then read in order, and the red Canada was stricken off.

Mr. Stark. I think we should strike off the Gilpin.

Mr. Riehl. It is not the best quality; there are apples in the orchard we can grow and present at a smaller price. Observation leads me to think that many buyers cannot tell the difference between a good and a poor fruit, and, while we have many people who have not enough of fruit, he that produces fruit in the greatest quantity at the lowest rate is a public benefactor. I will, and will try to get others to grow it for the public good.

Mr. Stark. I have no objection to the gentleman growing it, but I think that when we do raise fruit we should raise the very best. To cultivate an apple only that will pay may be well enough, but it is as easy to raise a better as this.

Mr. Riehl. I think Hewe's crab should be stricken off, because it don't hang well. Stricken off.

Mr. Stark. I think there are better apples for cider than the Newtown pippin, and it is not very well adapted to general cultivation. Stricken off.

Mr. Riehl. I think we should strike off the Harrison; it does not hang well.

APPLES PROMISING WELL.

Mr. Riehl. The Esopus Spitzenberg drops from the tree—does not promise well.

Mr. Stark. It is not raised in as great quantities as some. The apple is good, and of a character that many like well. It is not an early bearer, but bears well.

Mr. Sanders. The white winter pearmain is one of the best apples we have. It is good in most parts of this State. We have fine samples here from Illinois.

Mr. Stark. It does very well with us.

Mr. Gardner. It has got a good name generally.

Secretary. It does well on our hills.

Carried to the full list.

Mr. Riehl recommended the geniting and winesap for cider; the best apples we have. They are worthy of a higher place than we think.

Mr. Stark. It makes good rich cider. It is good for all purposes, and comes next to the geniting.

Mr. Avery and the Secretary were of the same opinion.

Mr. Stark offered the following:

Resolved, That the geological survey of Missouri, partially executed, and which has already been of much service in making known the resources of the State, should, in the opinion of this society, be resumed and completed; and that the attention of the Legislature is respectfully invited to the subject, and especially to the importance of the publication of the data already collected. Adopted.

FOURTH DAY.

The meeting was opened with prayer by Thos. R. Allen.

Mr. Gardner offered the following resolution:

Resolved, That the Recording Secretary be instructed to prepare the proceedings of this meeting for publication as speedily as possible, and hand the same to the Corresponding Secretary of the State Board of Agriculture, and that the sum of one hundred dollars be appropriated to pay him for such service. Adopted.

The Secretary read a list of newspapers that, with all of the city papers, had noticed this meeting, as follows:

Horticulturist and Farmer, DeSoto, Mo.
Conservative, Fredericktown, Mo.
Leader, Hillsboro, Jefferson county, Mo.
Journal, Tuscola, Ill.
Republican, Louisiana, Mo.
Plaindealer, Sparta, Ill.
Sentinel, Centralia, Ill.
Starr, Danville, Mo.
Herald, Quincy, Ill.
Caucasian, Lexington, Mo.
Register, Desmoines, Iowa.
Republican, Unionsville, Mo.
Independent, Hardin, Ill.

The Secretary read a letter and distributed circulars referring to a new patent galvanized iron trellis for fruits, flowers, and vegetables, by W. W. Wilcox, Conn. Also, a circular and model of the champion horse hoe cultivator, by Arnoldt & Crimm, which seems an excellent implement.

Mr. Jordan called attention to a beautiful vase manufactured by the St. Louis Stoneware Company—an excellent article.

A letter was, during the period of the meeting, received at the home of the Secretary, the importance of which to the society and to the agricultural community will justify its incorporation with these proceedings.—Sec. [The letter referred to may be found in the Corresponding Secretary's report of the Board of Agriculture, article on "County Societies."—President.]

The special order, entomology, was taken up.

Dr. Claggett thought this a subject that involved so much it ought to receive ample consideration.

Dr. Spalding. All feel the importance of securing the assistance of a thorough entomologist to aid us in our labors. There is a most important point, that of endeavoring to check our insect enemies by the destruction of their eggs, but in doing this we are apt to destroy our friends as well as our enemies, without a properly discriminating knowledge of them. He called attention to the *mantis*, one of our best friends, and to some samples of their eggs on exhibition, and to the fact of observing parasitic insects preying upon them. Two men in an orchard in the winter can destroy more insects in the egg than the birds can all summer. Some insects cannot bear water, and the use of a syringe or sprinkler in the tree, just when they are out of their nests, will destroy them in great numbers.

Mr. Jordan. I have given much attention to this subject. I have reared considerable quantities of the *mantis*, or "rear horse." They are easily bred. [Shows their eggs.] They do not pass through any change, but are hatched out in their perfect state. I have bred out considerable quantities of them in my office. They are an easy prey to birds and other insects. Another thing, I consider mulching gives much harbor to insects. Insects are most injurious in the *larvæ* state, and the mulch affords them shelter to carry on their depredations. I think it cheaper to keep clean than mulch. The *tettigonia* troubles us much. The solution of soap and tobacco is good; the smoke of tobacco is also good. The family of *borers* is another scourge.

Mr. Swallow. I find a garden engine is excellent to use, with the soap in solution. With this I have destroyed the curculio. Whale-oil soap is easily made. Buy the oil and prepare with lye, as with other soap; but we can get the soap here now. I used the tobacco water considerably. It will keep the bug and *aphis* from roses and other plants. I am satisfied that the *mantis* is a good fellow, and is becoming much more common than before. I am glad to know that they are so, and wish the birds were less so.

Dr. Spalding. I want to say that in all these modes of destroying insects by wholesale there is great danger of destroying our friends with our enemies.

Mr. Swallow. As to making and using the soap, if it is used too strong, or too strong lye washes, it will injure the leaves and bark as well as the insects.

Mr. Tice. There is a preparation of crysilic acid that is much recommended. Crysilic and carbolic acids are preparations from coal oil refuse. Carbolic acid is one of the best disinfectants. They are a specific in regard to the destruction of fungus, and may be of much use in those forms of disease in plants that are traceable to fungus, as well as in the case of insects. I see that some one advertises to send a pound by mail for one dollar. I think the society should take up the matter and test it.

Mr. Braches. I have tried clean culture for years in my orchard. The insects have ruined my trees and fruit until I thought I would have to give up fruit culture or move to a new place. I laid down my orchard in clover some years since. I cut the clover and lay it around the trees for mulch, and find the trees are much healthier and the fruit much finer. I would not allow any one to plow it up if they paid me ten dollars an acre for doing it. I think that the mulch not only invigorates the tree, keeping the ground more uniformly moist, but that it protects our friendly insects.

J. R. Allen called attention to the vast number of locusts or grasshoppers that had infested his orchard last year. He had a portion of it in clover, and when the first crop was cut he noticed them in great numbers, and late in the season they were in immense multitudes, eating up everything, cloth, leather, and turned upon 800 young trees, entirely defoliating them, and stripping off the bark. They leafed out again, and the grasshoppers ate them off again. He had intended having kept it in clover another year, but broke it up late in the season for the purpose of destroying the grasshoppers.

Mr. Murtfeldt. I think that Mr. Allen should raise turkeys, and he would change the grasshoppers into turkeys, and sell them at fourteen to sixteen cents a pound.

Mr. Jewett. I had a piece of ground that was overflowed; the grasshoppers eat it off clean, but that was the only part affected by them.

Dr. Spalding. I have no doubt that turkeys will eat grasshoppers, but if the gentleman saw them as they come from the western country, in such clouds that they literally darkened the sun, he would find it would take ten turkeys to the square foot, and the turkeys would take everything that could be raised the rest of the season to maintain them.

Mr. Edwards. In 1820, in the neighborhood of Lexington, Missouri, the grasshoppers were in such multitudes that they obscured the sun. It would have taken ten thousand turkeys to the acre. The next year, and for several years afterward, there were few or none.

Mr. Swallow. I have seen much of the grasshopper in traveling through the mountains. I think Mr. Allen's grasshoppers are different from them, and are not migratory ones. I think turkeys may in his case do good; but clean culture and nothing else will do for them.

Mr. Edwards. In Texas they are killed by plowing up during the winter. Clean culture does well there.

Dr. Morse read the report of the committee which had under its consideration the subject of the appointment of a State entomologist. They submitted the following resolution in place of the one first offered:

Resolved, That this society hereby petition the General Assembly of Missouri, now in session, to authorize the appointment of a State entomologist, who shall devote his time primarily to the study of such insects in the State as are injurious or beneficial to the farmer and fruit grower, and who shall make an annual report of the result of his investigations, to be published in the State Agricultural Report, in accordance with the recommendation of the State Board of Agriculture.

Resolved, That the President and Secretary be hereby directed to forward a copy of the foregoing, without delay, to the General Assembly.

Adopted.

Dr. Morse, on behalf of the Wine Committee, presented a partial report, which induced considerable discussion, during which Dr. Spalding said:

I notice that the scale of numbers does not range so high as it has done some years before. There is a difficulty here. The committee have perhaps taken a higher standard. The scale shows the wines as relative to each other, but to do full justice there needs to be a fixed standard by which the vintage of one year can be compared with that of another. We want to get the report to show as clearly as possible the really high character of the last season's vintage. I think that the entire numbers should be raised.

Mr. Bircher tried to show that the wines should be accurately tested by proper tests (and not by a scale of figures) in the manner that is employed in Europe.

Mr. Husmann. I think that a great part of the difficulty arose from exhibiting wines that were too new, and were not in condition for exhibition. This scale is good *in* the committee, but there are difficulties in arriving at the real merit of the wine. The scales and mode referred to by Dr. Bircher cannot be applied to new wine. The true character of many of these wines are not yet developed.

Mr. Bircher. It is impossible to judge correctly of wines till they are mature.

Mr. Jordan. I think it is impossible to judge of the wine correctly in any way but by the scale. I think that we shall find the vintage does stand high, and some of the wines were so nearly alike that it was hard to distinguish the difference; and while the scale would show perhaps every figure from 80 to 90, when we came to best, second best, and so on through, perhaps 14 varieties to the fourteenth best, still there might be but a few hundredths of difference between them all.

Mr. Murtfeldt. I am in favor of using the scale; it is the best mode of obtaining correct results, but it is difficult to compare the different classes of wine and the different vintages, for the want of a determinate standard.

Dr. Spalding. Our committees are constantly changing, and we cannot fix this standard at the same point; but I feel we are apt to do an injustice to the exhibitors and the vintage.

Mr. Husmann. Perhaps it is best to give both the numbers and the grade, so as to make the subject quite clear.

Dr. Morse. This idea seems right. I think we must have at least two committees, of five each, one for light and another for red wines.

Dr. Spalding. The chairman says the highest this year is 91 and last year we had 92, and this season we have better wines. This shows that if we do not raise the grade of the whole wines we will do an injustice both to vintage and maker.

Mr. Husmann. I will never exhibit wines so young as these. I have perhaps twenty varieties to exhibit in May; they are not fit to exhibit now.

Professor Swallow. It will be better to recommit the report. Adopted.

Mr. Mudd, from the Committeee on Agricultural and Mechanical Colleges, presented the following report, which was adopted:

Your committee, charged with the consideration of the agricultural and mechanical college, beg leave to report:

The subject is one which has claimed the earnest attention of the friends of agriculture, and its consideration has developed no small degree of conflicting feelings and opinions.

It is well known that a great portion of our agricultural friends have the conviction that the act of Congress looked primarily to the *establishment* of institutions of learning, the leading object of which was to promote the liberal and practical education of the industrial classes. Under the influence of this conviction, we have earnestly contended that the purpose of Congress in this liberal donation of lands would not be fully completed without the establishment of an industrial college, separate and apart from any existing literary institution. We have for some years clung to the hope of being able to carry out the purposes of the grant in this manner. If this can be done with a fund sufficient to the proper establishment of such an independent institution, on such a liberal and permanent basis as to give promise that it would become what the friends of an agricultural college would deserve, we have no hesitation in declaring our preference for the establishment of a Missouri industrial college.

This we shall not be able to do unless some Ezra Cornell, or other generous friend of sound learning and the agricultural and mechanical sciences, or some city, town, county or district, deserving the location of such an institution, shall develop the disposition to furnish the means necessary to the purchase of the necessary grounds, the erection of the necessary buildings, and furnishing of suitable apparatus and library. Various estimates of the amount required for this have been made, varying from two hundred thousand dollars to double that sum.

Without knowing where the necessary amount may probably be offered, we can hardly feel willing to dispose of the matter without offering to the people of the State an opportunity to show their appreciation of the advantages to result to them from securing the location of such an institution in their county or district.

On the other hand, it is equally as earnestly contended by many equally devoted friends of education that the agricultural college can be rendered quite as useful to the agricultural and mechanical classes by locating this college in connection with the University of Missouri, and, in advocating this view, urge that it can be placed in successful operation in promoting the objects of the grant at far less expense and in much shorter time than can be if we attempt a separate organization.

Your committee recognize the advantages claimed, and especially in the early opening of an institution offering the means of education contemplated by the Congress of the United States in making the donation of lands as an endowment. And we earnestly desire that no greater delay, than may be absolutely necessary, shall be made in organizing such means as shall present our agricultural and mechanical youth with the means of liberal and practical education. Under the influence of the views presented we are not prepared to advocate any particular point for an immediate location by the Legislature now in session, but beg to present the following resolutions:

1. Preferring as we do a separate location, we would respectfully ask our Legislature to pass an act appointing a board of commissioners to locate and organize the agricultural college; requiring said commissioners to advertise for donations of such means as may be necessary to the successful organization and operation of an industrial college—such means to consist of lands, buildings, or money—to be submitted at an early day when said commission shall select the most desirable location for said college, being governed in the selection by the following conditions, to wit: The amount of money, land, or buildings offered; that the location be easily accessible by some of our railroads or rivers; that the location be healthful; that the land shall be of quality and in quantity suitable for the purpose, and the money or other means equal to the erection of suitable buildings and purchase of necessary apparatus, library, furniture, etc.

2. Failing in obtaining the means necessary to the proper organization and successful operation of an independent college, that this board of commissioners shall certify the location of this agricultural college in connection with the State University; provided the lands necessary for an experimental farm, not less than three hundred acres, or a sum of money not less than $50,000, be donated by the people interested in securing the location at this point.

3. In any location of this college, we earnestly recommend that the agricultural and mechanical college shall be placed in some measure under the control of the farmers and mechanics of the State; that the board or boards of management shall be so constituted that a portion of them shall be chosen directly or indirectly by the agricultural, mechanical, and horticultural associations of the State.

4. We earnestly recommend that the lands selected for the benefit of the agricultural college be leased for a term of years on a plan similar to that so successfully adopted by our neighboring State of Iowa; and that none of the lands be sold until the construction of the Southwest Pacific road shall induce such settlement along the line thereof as shall give the lands a market value, which they have not at this period.

5. That a committee of three be chosen from this society to present our views, by memorial or otherwise, to the present Assembly now in session.

HENRY T. MUDD,
G. C. SWALLOW,
CHAS. PEABODY.

Mr. Eliot offered the following resolution:

Resolved, That inasmuch as the soil and climate of Missouri, in the opinion of practical grape growers, are eminently suited to the production of superior wines, as well as for general culture, the Missouri State Horticultural Society hereby joins the mass of the people of the State in a cordial invitation to general horticulturists to settle in a commonwealth that nature has provided with natural resources which fiction can scarcely exaggerate.

APPOINTMENT OF STANDING COMMITTEES.

The president announced that the following were the standing committees for 1868:

On Business.—Prof. G. C. Swallow, of Boone county; Messrs. J. M. Jordan, St. Louis, Missouri; W. F. Simmons, Audrain county, Missouri; E. A. Riehl, Illinois.

On Entomology.—Messrs. C. W. Murtfeldt, St. Louis; F. Stark, Illinois; F. W. Guy, Jefferson county: O. H. P. Lear, Marion county.

On Flowers.—Messrs. Henry Michel and J. Kœnig, St. Louis; Mrs. Shields, Boone county.

On Vineyards.—Dr. C. W. Spalding, St. Louis; Messrs. W. C. Flagg, Illinois; George Husmann, Hermann; H. M. Voris, Buchanan county; J. N. Peyton, Marion county; Raphael Bush, Jefferson county.

On Orchards.—Dr. E. S. Hull, Illinois; Messrs. C. Connor, St. Louis county; Tom. Walker, Jefferson county; E. A. Trabue, Marion county; J. R. Allen, St. Louis county.

Ad interim, North Missouri.—Prof. G. C. Swallow, Boone county; H. M. Voris, Buchanan county; Wm. Stark, Pike county.

Ad interim, South Missouri.—H. T. Mudd, St. Louis county; George Husmann, Gasconade county; T. W. Guy, Jefferson county.

Committee on Agricultural Colleges.—Henry T. Mudd, Dr. L. D. Morse, John H. Tice.

Adjourned.

AFTERNOON SESSION.

The following resolutions were unanimously adopted:

Resolved, That the thanks of this society are due to the railroads of this State, and to the St. Louis, Alton and Chicago railroad, for their favors extended in the return of our members in attendance at this meeting.

Resolved, That the thanks of this society are tendered to the city papers, and to such country papers as have published the notice of this annual meeting.

Resolved, That the thanks of this society are due and are hereby tendered to the Missouri Republican and the Democrat, for the very full and correct reports made of the proceedings of this meeting.

Resolved, That the thanks of this society are tendered to the county court of St. Louis county, for so generously furnishing this society with a convenient and comfortable room for our meeting.

Resolved, That this society are under renewed obligations to janitor Quigley, for his polite attentions during the meeting.

Resolved, That the thanks of this society are tendered to the hotels of the city that have so generously entertained our members, during their attendance at this meeting, at a reduction on the usual rates.

Resolved, That the Treasurer pay Edward Woodson twenty dollars, for services during the meeting, when the rooms occupied shall be cleaned up by him, to the satisfaction of the President of this society.

Resolved, That a warrant be drawn on the Treasurer for $81 81, expenses of circulars, etc., due H. T. Mudd.

Resolved, That the Secretary be instructed to purchase a good photograph album, of size to hold fifty pictures, and that he procure photographs (if possible) of all the presidents of this society, and preserve the same.

It was, on motion,

Resolved, That the next annual meeting be held on the fourth Tuesday of November.

On motion, the meeting adjourned, to meet in Columbia, Boone county, on the fourth Tuesday of November, 1868.

REPORT OF THE WINE COMMITTEE.

MR. PRESIDENT: The Wine Committee respectfully submit the following report:

CATAWBA WINE.

We have examined fourteen samples of Catawba of 1867, and although most of them were rather more immature than new wine generally is at this season, yet, with a single exception, which the committee did not recognise as Catawba, all were good.

Sample No. 6, made by John Bircher, of Highland, Ill., was decided, on the first vote, to be best. It is but just to say that a subsequent vote, in which a scale of numbers was used, placed this sample slightly below that by Jacob Rommel—the only objection to No. 6 being a slight taste of the cask.

No. 12, by Jacob Rommel, of Hermann, second best.

No. 15, by Charles Paffrath, Melrose, St. Louis county, third best.

The samples by Mr. Rommel and Mr. Paffrath were both excellent, and of nearly equal merit.

Two samples, vintage of 1866, by George Husmann, of Hermann, were very superior; No. 36 best.

Samples by N. Grein, of Gasconade Ferry, Mo., and Henry Henze, of Hermann, were of excellent quality—considerably better than an average.

Samples by J. N. Peyton, of Hannibal, Mo.; American Wine Company, St. Louis; J. J. Kelly, of Webster Grove, St. Louis county, and F. W. Braches, Gray's Summit, Mo., were of fair average quality.

Sample by W. E. Smith, of Alton, Ill., was imperfect in fermentation, and could not be judged fairly.

CONCORD, VINTAGE OF 1867.

Best sample, J. J. Kelly of Webster Grove, Mo.—a very light colored Concord, of decidedly superior merit; second best, by Jacob Rommel, of Hermann; third best, by J. J. Kelly; fourth best, by N. Grein, of Gasconade Ferry, Mo.; fifth best, by J. J. Schmidt, of Hermann, Mo.; sixth best, by Mr. Henckler, of Waterloo, Ill.; seventh best, by the American Wine Company, St. Louis.

A sample by H. S. Christian, of Jefferson county, Mo., was quite imperfect in fermentation, and lacked character.

Sample of 1866, by George Husmann, was of good quality—considerably above an average.

NORTON'S VIRGINIA, 1867.

Best sample, by Jacob Rommel; second best, by N. Grein; third best, by H. Henze, Hermann; fourth best, by P. Barron, Newport, Mo.; fifth best, by Jacob Rommel; sixth best, by American Wine Company.

A sample by H. S. Christian, not in condition to judge of its merit.

A sample, vintage of 1866, by George Husmann, was really a good wine, but was considered as falling below the average of the new wines.

MISCELLANEOUS.

To show the relative merits of the following varieties, we give the figures which are the average of the votes in committee, assuming 100 to represent the standard of excellence:

Cassady, 1866, by George Husmann, 91.
Herbemont, 1866, by George Husmann, 89.
Cunningham, 1866, by George Husmann, 89.
North Carolina seedling, 1866, by George Husmann, 86.
Delaware, by Jacob Rommel, 87.
Minor's seedling, by H. Henze, 59 3-5.
Isabella, 1867, by C. Paffrath, 54.
Isabella and Catawba, 1867, by Kling, of Louisiana, Mo., 52½.
Isabella and Catawba, 1867, by Kling, of Louisiana, Mo., 51.
Clinton, 1867, by American Wine Company, 72½.
Clinton, 1866, by N. Grein, 67½.
Cynthiana, 1866, by G. Husmann, 89 1-5.

It will be observed that in the above list many of the newer varieties maintain a very high rank. In a few instances, they should undoubtedly be ranked somewhat higher than the figures indicate, as the vote of one or two members, on the above plan, if they happen not to be familiar with a certain character of wine, may reduce the vote of the majority. It is gratifying to note an important improvement in the character of the wines exhibited. There was scarcely a sample of really poor wine, except such as were immature. This is no doubt due, chiefly, to more skill and experience among the makers, and partially to an unusually favorable season last year.

The wines of the last vintage are very superior, but they *fined* more slowly than is usual, hence several imperfect samples were on exhibition.

It will be noticed that Mr. Husmann and some others of our best vine makers exhibited no wines of 1867, not considering them in a fit condition.

We desire to caution wine makers strongly against putting wine into casks that have not been properly prepared or cleansed. If the cask imparts any flavor to the wine, it greatly deteriorates its quality, and several samples before us, otherwise very good, were much injured by this cause.

L. D. MORSE, *Chairman.*

Resolved, That the committees on fruit be instructed to revise the lists of fruits, and state the characteristics of each, its excellences and defects, and whether it succeeds better in any particular soil, location, or climate.

Resolved, That the committee recommend a list of apples for cider.

Resolved, That the Secretary be requested to make up and submit to the society at its next meeting a list of all the varieties of fruits recommended by this society for any purpose, and that thereafter the discussion of fruits shall be limited to changing this list.

Resolved, That hereafter, instead of having a special committee on wine, there shall be appointed by the President the following committees, consisting of three members each: On Catawba wines, Concord wines, Virginia wines, other varieties of wines, and on wines of other fruits than the grape.

LIST OF FRUITS ADOPTED AT THE NINTH ANNUAL MEETING, JANUARY, 1868.

Apples.—Summer, for market: Early harvest, red June, red astrachan, and sops-of-wine.

For family: Same, adding Benoni, sweet June, American summer pearmain, early strawberry, summer queen.

Fall, for market: Maiden's blush, rambo, Hubbardston, nonesuch, Famuese, Ramsdell sweet.

Early winter: Wine or Pennsylvania redstreak, Smith's cider, Porter, fall queen, Pryor's red, Rome beauty, Moore's sweet.

For family: Yellow bellflower, Peck's pleasant, Rhode Island greening, American golden russet, Jonathan, Newtown Spitzenberg, Wagoner, Fallowater.

Late winter, for market: Rawle's janet, Newtown pippin (on limestone soils), willow twig, winesap, Gilpin, Ben Davis, ladies' sweet, white winter pearmain.

For cider: Winesap, Gilpin, Rawle's janet.

Promising well for trial in Missouri: Esopus Spitzenberg, Bailey, winter sweet, autumn pearmain, Belmont, early Joe, Elieck's winter sweet, evening party, Fulton, Haskell's sweet, Herman, Minkler, Keswick, Codlin, King of Tompkins county, Kirkbridge white, lemon pippin, limber twig, Ortley, Westfield, seek-no-further, white pippin, William's favorite, huntsman's favorite, Tenbuer's for cider.

Pears.—Summer, for market: Doyenne, d'Ete, beurre Giffard, Tyson, Bartlett.

For family: The same, adding Rosteiger and Dearborn's seedling.

Autumn, for market: Howell, beurre d'Anjou, Flemish beauty, Louise bonne de Jersey, Seckle, standard, white Doyenne, Buffum, Napoleon, Duchess d'Angoulême, beurre bosc, standard, beurre diel.

For family, same list.

Winter, for market: Glout Morceau, winter Nelis, Lawrence, Vicar of Winkfield (excellent for cooking), Easter beurre.

For family, same list.

Two best pears of each season for market: Summer—Doyenne d'Ete and Bartlett. Fall—Louise bonne de Jersey and beurre bosc. Winter—Easter beurre and winter Nelis.

Peaches.—Hale's early, 20th of July, F.
Troth's early, 26th of July, M. F.
Large early York, 10th of August, M. F.
George IV, 15th of August, M. F.
Oldmixon free, 15th of August to 1st of September.
Columbia, 1st of September.
Late Crawford, 1st to 15th of September, F.
Oldmixon cling, 5th of September.
Ward's late free, 15th to 20th of September.
Smock's free, 20th September, M. F.
Red cheek melacatoon.
Heath cling, M. F.
Washington cling.
Late admirable.
Early Crawford.
Lagrange, F.
Morris' white, F.
Yellow rareripe, F.
President, F.

This dates for about the latitude of St. Louis.

Cherries.—Black Tartarian, May Duke, early May, Governor Wood, Gridley, English morello, Belle de Choisy.

Heart and bigarrean varieties are tender in most locations in this State.

Apricots.—Large early, early golden, Hemskirke, peach.

Nectarines.—Elruge, Pitmaston's orange.

Plums.—Jefferson, Smith's Orleans, diamond, Pond's seedling, German prune, Lawrence's favorite, Ickworth imperatrice, Washington.

Strawberries.—Wilson's Albany, M., Longworth's prolific, M. F., Russell, F., Cutter's seedling, F., McAvoy's superior, F.

Raspberries.—Doolittle, M. F., purple cane, M. F., Miami (trial), Philadelphia (trial), Catawissa (trial).

Blackberry.—Lawton, Kittatinny (trial), Wilson's early (trial).

Currants.—Cherry, red Dutch, white grape, white Dutch.

CONSTITUTION AND BY-LAWS

OF THE

MISSOURI STATE HORTICULTURAL SOCIETY,

WITH A LIST OF THE

OFFICERS AND COMMITTEES FOR 1868.

CONSTITUTION.

1. This association shall be known by the name of the Missouri State Horticultural Society.

2. Its officers shall consist of a president, one vice president from each congressional district in Missouri, a recording secretary, a corresponding secretary, and treasurer. There shall also be a standing committee of not less than three persons each, on the following subjects, viz: business, entomology, flowers, vineyards, and orchards. Special committees may also be appointed by order of the society.

3. All officers shall be elected by ballot.

4. The duties of the president shall be to preside and keep order at all meetings of the society, countersign all checks or drafts drawn by the secretary on the treasurer, and appoint all committees.

5. The duty of the vice presidents shall be to preside at meetings in the absence of the president, in the order of the numbers of the several congressional districts, and report in writing to each annual meeting concerning the condition of horticulture within their districts.

6. The duties of the recording secretary shall be to keep a record of all the proceedings of the meetings, record the names of the members of the society, draw orders on the treasurer for the payment of all debts of the society, and, when ordered, prepare the transactions of the society for the press.

7. The duties of the corresponding secretary shall be to conduct all correspondence in behalf of the society.

8. The treasurer shall record all names of members of the society, collect all the dues, and disburse the same upon orders drawn by the secretary and countersigned by the president.

9. It shall be the duty of the standing committee on business to prepare matter for discussion and other business for action of the society at its meetings, and bring the same before them in a proper manner.

10. It shall be the duty of the other standing committees to make examination during the year of the special subjects for which each committee is respectively appointed, and report their labors at the next annual meeting.

11. Any person may become a member of this association by paying two dollars annually, or a member for life by the payment, at one time, of ten dollars.

12. Honorary members may be elected by ballot vote, and all such members shall be entitled to all the privileges of the society.

13. Annual meetings of the society shall be held at St. Louis on the second Tuesday in January of each year, unless otherwise ordered by the society.

14. Special meetings may be called by the president and one of the secretaries whenever they deem that the interests of the society will be thereby advanced.

15. All officers and members of committees shall hold their office one year, or until their successors are chosen.

16. All vacances that may occur during the interim of the annual meetings shall be filled by the president and secretary.

17. By-laws may be enacted by the society at any of its annual meetings.

18. This constitution may be amended at any annual meeting upon a two-thirds majority vote of the members present.

BY-LAWS.

1. The expenses of the society shall be paid out of the treasury; but in case of a deficiency in the treasury, such deficit shall be made up by a *pro rata* assessment on the members of the society.

2. The annual fee of membership shall be promptly paid at the regular January meeting of the society.

3. The treasurer shall make a report showing the financial condition of the society at each annual meeting.

4. The annual election of officers shall be the special order at the opening of the afternoon session of the second day of the meeting.

5. Six votes at least shall be given in favor of any fruit to place it on the list indorsed by the society.

MISSOURI HORTICULTURAL SOCIETY.

OFFICERS FOR 1868.

PRESIDENT,

CHARLES PEABODY, Jefferson county.

VICE PRESIDENTS,

J. M. JORDAN, St. Louis county	First District.
TOM. WALKER, Jefferson county	Second District.
ALVA CULVER, Ste. Genevieve county	Third District.
F. FINE, Greene county	Fourth District.
J. L. MINOR, Cole county	Fifth District.
ELLDREGE BURDEN, Lafayette county	Sixth District.
H. M. VORIS, Buchanan county	Seventh District.
J. M. PEYTON, Marion county	Eighth District.
WM. STARK, Pike county	Ninth District.

CORRESPONDING SECRETARY.

R. S. ELIOT, Kirkwood.

RECORDING SECRETARY.

WM. MUIR, Fox Creek P. O., St. Louis county.

TREASURER,

JOHN H. TICE, St. Louis.

STANDING COMMITTEES.

On Business—Prof. G. C. Swallow, of Boone county; Messrs. J. M. Jordan, St. Louis, Mo.; W. F. Simmons, Audrain county, Mo.; E. A. Riehl, Illinois.

On Entomology—Messrs. C. W. Murtfeldt, St. Louis; F. Stark, Ill.; T. W. Guy, Jefferson county; O. H. P. Lear, Marion county.

On Flowers—Messrs. Henry Michel and J. Koenig, St. Louis; Mrs. Shields, Boone county.

On Vineyards—Dr. C. W. Spalding, St. Louis; Messrs. W. C. Flagg, Ill.; Geo. Husmann, Hermann; H. H. Voris, Buchanan county; J. N. Peyton, Marion county; Raphael Bush, Jefferson county.

On Orchards—Dr. E. S. Hull, Ill.; Messrs. C. Connor, St. Louis county; Tom. Walker, Jefferson county; E. A. Trabue, Marion county; T. R. Allen, St. Louis county.

COMMITTEES AD INTERIM.

North Missouri—Prof. G. C. Swallow, Boone county, H. M. Voris, Buchanan county; Wm. Stark, Pike county.

South Missouri—H. T. Mudd, St. Louis county; Geo. Husmann, Gasconade county; T. W. Guy, Jefferson county.

SPECIAL COMMITTEES.

Gallizing, continued—W. C. Flagg, Dr. L. D. Morse, Geo. Husmann, Dr. E. S. Hull, Dr. C. W. Spalding.

On Agricultural Colleges—H. T. Mudd, Dr. L. D. Morse, John H. Tice.

On Weights and Measures of Fruits—Dr. Edwards, Wm. Muir, H. T. Mudd.

PROCEEDINGS

OF THE

MISSISSIPPI VALLEY GRAPE GROWERS' ASSOCIATION.

PRELIMINARY MEETING OF THE ST. LOUIS VINE GROWERS' ASSOCIATION.

According to previous announcement, some thirty-five or forty gentlemen engaged in grape growing met in the Supreme Court room, at the courthouse, in St. Louis, January 10, 1867, to form a grape growers' association for this State and vicinity. On motion of Dr. Spalding, Geo. Husmann, of Hermann, was chosen chairman pro tem., and Messrs. Wm. Muir and J. M. Pierson were chosen secretaries.

Mr. Husmann stated the object of the meeting to be two-fold: first, the grape interest is of such magnitude that we want more time to discuss that than can be devoted to it at our horticultural meetings; and it is necessary that we have at least two exhibitions per year, one in the fall and another in spring. New wines are not in a fit state to be examined and passed upon at this season of the year, and by having an exhibition in spring, say in May, the wine will then be in a proper state to be tested and passed upon.

At agricultural exhibitions, and especially those of the St. Louis Agricultural and Mechanical Association, the grape and wine interest comes out at the tail end; while $6,500 is sometimes given to a single horse, the grape and wine interest will not get more than $60.

Dr. Spalding presented the following resolution, which was adopted:

Resolved, That it is expedient to organize a society for the promotion of grape culture in our State and its vicinity.

Dr. Spalding thought the time had come for the formation of such a society; aside from the reasons before stated by the President, there were yet others. Nine-tenths of the wines drunk in this country were imported from foreign countries, and a great deal of the stuff sold as wine was only a vile mixture. The import duties made high prices, and as the government had to keep up the revenue the prices would be high for years to come; and therefore we ought to encourage the growth and manufacture of wine for our own and the national interest, and not allow so much money to go out of the country for an article that we could just as well produce at home.

On motion, the following gentlemen were appointed a committee to draft a constitution and by-laws, and report at a future meeting:

Dr. C. W. Spalding, Chas. Peabody, C. N. Andrews, E. A. Riehl, O. P. H. Lear, Geo. Husmann.

CIRCULAR

ISSUED APRIL, 1867, TO THE GRAPE GROWERS OF THE MISSISSIPPI VALLEY.

A meeting to effect an organization of grape growers was held at St. Louis on the tenth of January, at which the following resolutions were unanimously adopted:

Resolved, That it is expedient to organize a society for the promotion of grape culture in our State and its vicinity.

Resolved, That a committee of five be appointed by the Chair to prepare a constitution and by-laws, and report at a future meeting.

Resolved, That this committee be instructed to prepare and publish an address to the grape growers, showing the necessity of such an association.

Resolved, That the next meeting be held on the fourth Wednesday of May next.

The President appointed Dr. C. W. Spalding, Rev. C. Peabody, Dr. C. N. Andrews, E. A. Riehl, and O. P. H. Lear said committee.

It was resolved that the President be *ex-officio* a member of said committee.

In compliance with the foregoing, the undersigned cordially invite the grape growers of Missouri and the adjoining States to assemble at the city of St. Louis, on the fourth Wednesday of May next, for the purpose of organizing the association contemplated by the above resolutions.

This branch of horticulture has already become so large, and the amount of territory in this section adapted to the successful culture of the grape is so very extensive, that the necessity of such an organization has long been felt and acknowledged. The time seems now to have arrived when the benefits arising from the operations of a society devoted exclusively to subjects connected with the grape are too evident to require elucidation, and too important to be longer neglected.

Hitherto our horticultural societies have been too much engaged in the discussion of other topics to devote sufficient time to the proper consideration of those relating especially to the grape; and all who are interested in viticulture have felt the want of a more full discussion, and a wider comparison of the different modes of propagation, culture, etc., than can be had in any of the existing societies.

The season of the year, too, at which such meetings are usually held is not the best for an advantageous display of the products of our vineyards, being too late for grapes and too early for the young wines of the previous season.

It is hoped and believed that such a society as it is now proposed to organize will be able to offer such liberal premiums for both grapes and wines as shall invite and secure competition from so wide an extent of country as to bring together not only a large number of varieties, but also to afford an opportunity for comparing the products of the various soils which are known to exist in this region, and of determining the relative merits and capabilities of different latitudes and localities.

Much more might be added; but enough, we think, has already been said to show the propriety of adopting the measure proposed, and we trust the grape growers of the valley of the Mississippi will generally respond to this invitation, and come together in such numbers as shall attest their devotion to the interests of their ennobling pursuit.

C. W. SPALDING,
C. PEABODY,
C. N. ANDREWS,
E. A. RIEHL,
O. P. H. LEAR,
Committee.

GEORGE HUSMANN, PRESIDENT *pro tem.*

COURTHOUSE, ST. LOUIS, *May* 22, 1867.

An adjourned meeting of those favorable to the organization of a grape growers' association was opened at 11 o'clock, A. M.

In the absence of the President, the Secretary called the meeting to order, and the Rev. C. Peabody was, on motion, called to the chair.

The minutes of the former meeting were read and approved.

Dr. C. W. Spalding, chairman of the committee on address and constitution, read the following report:

The committee appointed at the preliminary meeting held January 10, 1867, report that they issued a circular in April, of which the accompanying paper is a copy. (See above.) They also now present a draft of a very brief constitution for the consideration of this meeting.

C. W. SPALDING, *Chairman.*

Mr. Husmann, President *pro tem.*, having arrived, took the chair.

The report was received, and the articles of the constitution were, on motion, taken up *seriatim* and adopted.

CONSTITUTION.

ARTICLE 1. This association shall be called the Mississippi Valley Grape Growers' Association.

ART. 2. The officers shall consist of a President, Vice President, Secretary, Treasurer, and an Executive Committee of five, exclusive of the President, Vice President, and Secretary, who shall be members of said committee *ex-officio.* The officers shall be elected annually, by ballot, and shall hold their offices until their successors are chosen.

ART. 3. The Executive Committee shall have charge of all exhibitions held by this association, and when premiums are offered shall report a list for the action of the association, and discharge the duties of an *ad interim* committee.

ART. 4. It shall be the duty of the Secretary to notify the members of the time and place of each meeting of the society.

ART. 5. The annual fee for membership shall be two dollars, payable at the annual meeting. Each member will be entitled to a ticket of admission to the exhibitions and to a copy of the transactions of the association.

ART. 6. Special committees shall consist of three members each, and be appointed by the Chair unless otherwise ordered by the society.

It was, on motion,

Resolved, That the association proceed to the election of permanent officers.

Whereupon the President appointed Messrs. Tice and Peabody tellers, when the following officers were declared duly elected: President, Dr. C. W. Spalding, St. Louis; Vice President, George Husmann, Hermann, Missouri; Secretary, Wm. Muir, Fox Creek P. O., St. Louis county, Missouri; Treasurer, J. H. Tice, St. Louis.

Executive committee.—John H. Tice, St. Louis, Missouri; Tom. Walker, Jefferson county, Missouri; Dr. E. S. Hull, Alton, Madison county, Illinois; N. W. Bliss, Warsaw, Hancock county, Illinois; Philip Eisenmeyer, St. Clair county, Illinois.

Mr. G. Husmann presented a letter from Colonel McKissock, of the Pacific railroad, expressing his warm interest in the development of grape culture in Missouri, and according *free* return tickets to those in attendance, on the certificate of the Secretary.

It was, on motion,

Resolved, That a committee of one be appointed to wait on the superintendents of the other railroads with a view to secure the same favors.

The President appointed Rev. Charles Peabody said committee.

Considerable discussion was had on the question as to whether the fall exhibition of this association be held at the same time and in connection with the meeting of the American Pomological Convention to be held on the 11th September next; when it was finally

Resolved, That this association hold a wine exhibition in this city at the time of the meeting of the American Pomological Society.

John H. Tice presented the following resolution:

Resolved, That the members of this association be requested to observe the meteorological condition of the atmosphere during the summer months—that is, its temperature, hygrometric and electric conditions—with a view to ascertain whether diseases of the grape have any connection with the same.

Which, after considerable discussion, was adopted.

Dr. Morse presented the following resolution:

Resolved, That the annual meetings and wine exhibition of this association be held on the first Wednesday of May. Adopted.

Dr. Morse moved that a committee of three be appointed on new varieties. Lost.

Mr. Husmann moved that the President appoint two committees, of three each, one to examine and report on red wines, the other to examine and report on white wines. Adopted.

Dr. Claggett moved that a committee of three be appointed to report on the soils best adapted to the growth of the grape. Adopted.

The President appointed Messrs. Claggett, Andrews, and Riehl said committee.

Dr. C. N. Andrews moved that a committee of three be appointed to extend the courtesies of this association to the American Pomological Society at its next meeting, to be held in St. Louis, and that the President be chairman of that committee. Adopted.

Dr. Claggett moved that standing committees be appointed on soils, varieties, insects, pruning, and modes of culture, etc., with instructions to report to regular meetings; which, after considerable discussion, was lost.

Dr. Morse presented bill for test glasses and basket for use of the association. Ordered to be paid.

J. M. Jordan suggested that the committee appointed to report upon wines be instructed to call for, and give, as soon as possible, information as to how the several samples are manipulated, and state the defects in inferior grades, as well as the excellences of the superior samples.

Dr. Morse proposed that the two committees upon wine, when appointed, be instructed to report standing rules by which wines shall be judged. Adopted.

The President announced the following committees on wines:

Red wine.—L. D. Morse, E. R. Mason, N. W. Bliss.

White wine.—E. A. Riehl, H. Rœsch, J. M. Jordan, Adolphus Engelman.

Mr. Husmann moved that a committee of ten be appointed to solicit money to form a fund for premiums on native wines. Adopted.

The President appointed the following gentlemen as said committee:

N. G. Colman, G. W. Simpkins, J. M. Jordan, all of St. Louis county; Dr. W. S. Dyer, Vineland, Jefferson county, Missouri; Wm. S. Jewett, Peevly, Jefferson county, Missouri; George Husmann, Gasconade county, Missouri; E. A. Riehl, Alton, Madison county, Illinois; E. Engelman, Shiloh, St. Clair county, Illinois; N. W. Bliss, Warsaw, Hancock county, Illinois.

Dr. Hull introduced the subject of mildew and other diseases of the grape, and the necessity of widely extended microscopical observations as to its cause, progress, etc., which elicited considerable discussion. Whereupon it was

Resolved, That this society instruct the President to purchase and use, or put in the hands of such members as will use it, a microscope to study the diseases of the grape, whenever the funds of the society will so justify it.

REPORT.

The Committee on Wines, to whom was referred the subject of rules for judging wines, submitted the following report:

We recommend that when wines are presented for judgment by committees, they shall be received by the Secretary, and by him or a duly appointed assistant shall be marked and labeled as follows, all other marks being removed: Each bottle shall be labeled with the name of the grape or grapes from which the wine was made, the date of the vintage, and a number which shall correspond with the same number on a list which shall be on file with the Secretary. Said list shall contain, so far as exhibitors are willing, a statement as to the variety, the soil, locality, and method of making said wine.

The labels on the bottles of wine shall be in one hand writing, and the committees shall give their judgment in figures, on a scale from one to ten, in accordance with the numbers on the labels, and then, before making out their report *in extenso*, shall compare the same with the list in the hands of the Secretary, and give such facts and conclusions as shall be deemed of public interest.

It shall be understood that wine committees, in judging in the scale of ten, shall consider varieties in that scale relative to the particular variety, and not as compared with other varieties of the same class; and, also, shall report *upon the comparative* value of the different wines in their respective classes. Adopted.

REPORT OF THE COMMITTEE ON RED WINES.

The Committee on Red Wines respectfully report having examined the following varieties, viz:

One sample of Concord, of the vintage of 1865, of sound body, and a fair, agreeable table wine. This sample was made by Mr. George Husmann, of Hermann.

Three samples of Concord, of 1866, two of them not differing much in character from the sample of 1865. The sample receiving the highest vote was made by Mr. Michael Poeschel, of Hermann. The second best was by the same maker.

One sample of Hartford prolific. This shows that a wine of creditable character may be made of this grape—inferior, however, to Concord. It is somewhat of a claret character, though not so highly colored.

One sample of Clinton, more of a claret, ranking higher than Hartford prolific, though falling below Concord.

One sample of Cynthiana, which fully sustains the high character of samples formerly exhibited of this variety, as a very superior and agreeable dark-red wine. The foregoing three samples were made by George Husmann.

One sample of Ives' seedling, presented by Mr. Husmann, from the Longworth Wine House, Cincinnati. This is a red wine, with a slightly purple tinge, very agreeable aroma, rather acid, having a taste as though made of imperfectly ripened grapes. We think this variety promises to take a position somewhat above the Concord in character.

Another sample of Ives' was before us, said to have been made in Cincinnati, quite equal to the above in body, but showed bad handling.

Two samples of Norton's Virginia, 1865, both excellent samples of this important variety. That made by Michael Poeschel was considered best; the other, made by Mr. Husmann, was considered of nearly the same quality.

Two samples of Norton's Virginia, 1866. That made by Mr. William Poeschel, exhibited by Mr. Husmann, was considered perfect—certainly the best ever tasted by the committee. The other sample was by Michael Poeschel, and was equal to any other sample, except the last preceding.

L. D. MORSE, *Chairman.*

REPORT ON WHITE WINES.

The committee appointed to examine and report upon white wines respectfully report the following on the table, upon which we have passed, judging their quality on a scale of ten:

Catawba, 1865, George Husmann, 7⅓.
Catawba, B, 1866, M. Poeschel, 7½.
Catawba, A, 1866, M. Poeschel, 8.
Catawba, 1866, W. Poeschel, 7.
Cassady, 1866, G. Husmann, 5⅔.
North Carolina seedling, 1866, G. Husmann, 5⅔.
Taylor seedling, G. Husmann, 6⅔.
Taylor seedling, M. Poeschel, 7⅔.
Herbemont, 1865, M. Poeschel, 8⅔.
Herbemont, 1865, G. Husmann, 6⅓.
Herbemont, 1866, G. Husmann, 6.
Cunningham, 1865, G. Husmann, 7⅓.
Cunningham, 1866, G. Husmann, 7.
Rulander, 1865, M. Poeschel, 8⅓.
Delaware, 1865, G. Husmann, 7⅔.

ADOLPH ENGELMAN,
H. ROESCH,
J. M. JORDAN,
E. A. RIEHL, *Chairman.*

It was, on motion,

Resolved, That the President be instructed to audit the bills for current expenses, in order to their being paid by the Treasurer.

It was, on motion,

Resolved, That the thanks of this association are due and are here by tendered to the honorable commissioners of the county court for their kindness in aiding the cause of progress in the grape-growing interest, by accommodating us with a room for holding our meeting; and, also, to the gentlemanly janitor, Captain James Quigley, for his kindness and attention during the session.

Adjourned.

W. MUIR, *Secretary*.

In agreement with a resolution passed at the May meeting, the Mississippi Valley Grape Growers' Association held an exhibition of wines conjointly with the meeting of the American Pomological Society, held in the city of St. Louis, commencing on the 11th of September, 1867.

At this exhibition there were brought together twenty varieties of American wine. This is believed to be the largest collection of native wines ever gathered for public exhibition, and serves to demonstrate the fact that the number of varieties of native grapes capable of yielding a good wine is much larger than has been commonly supposed. The wines were divided into three classes, viz: red wines, Catawba wine (still and sparkling), and other wines of light color.

The President of the Mississippi Valley Grape Growers' Association selected committees composed of three each for the several classes.

The Committee on Red Wines was composed of Dr. John A. Warder, of Ohio, Chairman; Frederick Muench, of Missouri, and John Elwanger, of New York. That on Catawba (still and sparkling), William Griffith, of Pennsylvania, Chairman; William Heaver, of Ohio, and William Saunders, of Washington, D. C. That on other wines of light color, Hon. Marshal P. Wilder, of Massachusetts, Chairman; Prof. George Thurber, of New York, and Robert Buist, of Pennsylvania.

The reports of the several committees were as follows:

MAJORITY REPORT.

To C. W. SPALDING, *President of the Mississippi Valley Grape Growers' Association:*

Your committee to whom was assigned the duty of examining the red wines at the recent extensive exhibition of vineyard products, after due examination, make the following report:

It may be supposed by some of the contributors that we were unnecessarily fastidious, and possibly it may be thought that we were too severe in our judgments of some of the samples presented, but all may rest assured that the work was done, or attempted to be done, according to instructions received from the society we were called upon to serve. In order that we might act without the bias of favor or affection, the owners' names had been removed from the bottles before they were presented to us, who received them only under the designation of a number, and generally the name of the grape from which the juice had been expressed. Indeed, the report is now rendered to you with our remarks opposite the number upon each bottle presented, and we are still ignorant of the names of the contributors, except in two or three instances, where it is well known that certain varieties of grapes were made into wine by a single man, or by few individuals.

Your committee lay no claim to infallibility in their decisions, and are perfectly well aware that the verdict now rendered may not be in accord with the opinions of the wine makers whose articles were examined; indeed, we were not always agreed among ourselves; we therefore beg to be excused from blame.

PURITY OF WINES.

A part of the committee had often before expressed their desire that the product of American vineyards should be presented to the consumers in a state of perfect purity; that the juice of the grape, unadulterated and unmixed with any foreign material, should be allowed to *make itself* into the vinous product, and not be manufactured by the wine handler. If not possessed of the true wine making properties, let the variety be abandoned in favor of some other more generous grape. We were, however, aware of the wide dissemination of the teachings of Gall, and of their popularity in parts of the grape region over which you preside, and therefore we anticipated that some of the samples to be examined would prove to have been of this character; nor were we disappointed, though it may prove that in some cases we have passed a favorable judgment upon some of the gallized samples. This may be taken as evidence of our impartiality.

One of our number did not hesitate to take decided grounds in favor of the Gall method of treating grape juice. He was, indeed a very ardent admirer of this plan, and argued that it was necessary to enrich the juice of some grapes, at least in bad years, and to tone down certain qualities of acidity and flavor which would otherwise necessarily prevent the product of fermentation from being a good sound wine.

While the majority of your committee admit that the wine of certain vintages is acid, harsh, and poor, and that samples of the gallized must have been presented to us which were very palatable, we must aver that other samples treated by this method were very indifferent. But, while making this admission as to the successful result of the labors of some honest and judicious wine makers, we cannot shut our eyes to the wide door that is thus opened to the fraudulent application of the process by unprincipled knaves.

It is not for your committee to enter into any argument with the chemists, much less to find fault with them. To their rigorous and careful analyses and investigations the intelligent wine grower is under lasting obligations for the light which has been shed upon the mysterious processes going on in the organism of the growing and ripening fruit. The chemists have explained the changes that occur during the transformation of the crude sap into the acid juices, and of these into the rich, luscious saccharine and other products of the matured fruit, and afterward those that occur in the separated juice in the depths of the wine cellar.

It is only to what may be considered the quackery of chemistry we would ask your attention, in order to show the fallacy of the teachings of some who would have us believe that by means of chemistry we can make an artificial wine, a fabricated article, that shall be as good or even better than the natural article, and we feel impelled to quote an eminent writer upon vinification, who, when discussing this topic, exclaimed: "Would to God that humanity might be spared the infliction of chemically prepared wines!"

After examining this subject in detail, the same author, Mr. Jules Guyot, entreats "wine growers, wine merchants, and wine drinkers, all over the land, to cry out against any man who may pretend to make superior wine from verjuice and sugar, or who will boast that by means of artificially enriching his must he has made a grand wine from a vintage that would have naturally produced only a good wine; or a good wine from grapes that were only fitted to make an inferior article. Such an one deceives himself or you. Protest especially against the man who makes wine by admixtures of sugared water with verjuice, or by macerating the marc in sugar water. Such a man commits a fraud upon trade as much as if we were to sell muslin for linen, unless he takes care to inscribe upon his casks and bottles, 'wine made with sugar,' or, 'made from the marc of grapes and sugar water,' or, better still, 'one-fourth, one-third, or one half grape juice, with three fourths, two-thirds, and one-half water, with cane sugar, beet sugar, starch sugar,' etc. With an honestly prepared ticket placed upon the product, let every one be allowed to sell what he may choose to fabricate, so long as he does not present anything really noxious and dangerous to the public health. Some simple legal enactments, well carried out, would preserve the vigneron, the merchant, and the public from frauds, excesses, and evils with which we are threatened by the fabrication of wines."—*La Culture de la Vigne et Vinification, par Jules Guyot* (*p.* 314).

In vegetable and animal physiology there are many bodies which have properties that cannot be detected nor decided by scientific and chemical tests, though they have unquestionable differences. The ultimate analysis of their composition gives a similar result. In different fruits that produce sugar, this substance is peculiar in each, and different from that of others. So of the other substances or proximate principles of which the fruits are composed. Consequently we find that the alcoholic product of the fermentation of these several fluids is different in each case. These different juices of fruits can no more be prepared or compounded by the chemist than the lacteal or other fluids of different animals can be artificially produced; and, like them, each is endowed by nature with its own well recognized but inimitable peculiarities. So, also, we shall find unmistakable differences in the results of fermentations of solutions of these several saccharine substances. The spirit derived from the fermentation and subsequent distillation of the glucose produced from potato starch is different from that made from grains; these differ from one another and from that made from cane sugar, and much more from that produced by the fermentation of the sugar of milk, and from that made from many sacchariferous plants of tropical climates. To a less extent the spirit separated from different wines will be found to be possessed of properties peculiar to each; but the moment we attempt to combine any of these saccharine substances with our grape juice, as sources of alcohol to make up for the deficient richness of our grapes, and do it in the vain hope of their being assimilated in the vinous product in the process of fermentation, we shall be disappointed, because the result of their fermentation will not be true wine-brandy or spirit, but it will partake, to the extent of the admixture, of the peculiar qualities of the substance from which it was derived, whether that have been Indian corn, rye, sorghum, or potatoes. Though rendered stronger than they would have otherwise been; though "ennobled" in the amount of spirit, to compensate for their dilution and *extension* with river or rain water, our wines will be necessarily depreciated by the admixture of spirit-producing material from a foreign source, and they will be more or less damaged, in proportion to the meanness of the source whence the saccharine and spirit-producing material was obtained. To the physiologist, and to the practitioner of medicine, we leave the consideration of the influence upon the health of consumers which may be expected to be produced by the use of such mixtures.

In conclusion, your committee take pleasure in bearing testimony to the energy and enterprise that has been manifested by the wine growers of the United States, and especially by those of different and widely separated points of the great valley of the Mississippi, as has just been shown by the magnificent display of the products of their vineyards and wine cellars spread upon your tables. No one can contemplate the importance of this great branch of American agriculture without feeling proud of his country and of his countrymen.

REMARKS UPON THE SAMPLES AS EXAMINED BY THE COMMITTEE, AND RECORDED BY PROF. G. THURBER, OF NEW YORK.

No. 20, Clinton, vintage 1860.—Indifferent in quality, of poor body, and too acid. Made by George Husmann, Hermann, Mo.

No. 39, Mish.—Heavily sugared, and poor. Made by Geo. Mish, North Carolina.

No. 33, "Missouri Black Rose."—This wine is said to be made from the Norton, gallized by a new process, the particulars of which were not stated. The committee were divided in opinion as to its quality, as compared with wine from the same grape without gallizing. Objection was also made to the name. Made by Dr. A. Hammer, St. Louis, Mo.

No. 10, Wild Grape.—Indifferent. Made by M. Poeschel, Hermann, Mo.

No. 44, Ives.—The committee was divided in opinion, two being in favor and one opposed to its commendation. Made by Longworth's Wine House, Cincinnati, Ohio.

No. 19, Cynthiana.—A very fine wine, with a delicate astringency. Made by Geo. Husmann.

No. 60, Oporto.—Very acid, and inferior. Made by Suel Foster, Muscatine, Iowa.

No. 62, Oporto and Concord.—Utterly worthless. Made by Suel Foster.

No. 1, Concord.—Inferior. Made by Dr. W. S. Dyer, Vineland, Mo.

No. 15, Concord.—Good. Made by Geo. Husmann.

No. 52, Concord.—Very good. Made by Theo. Engelman, Mascoutah, Ills.

No. 13, Concord.—Inferior. Made by J. F. Walter, St. Louis county, Mo.

No. 27, Concord.—Inferior. Made by Geo. Husmann.

No. 31, Concord.—Fair to fine, the committee being divided. Dr. A. Hammer.

No. 37, Concord.—Very good. Made by Jacob Kahn, Hermann, Mo.

No. 7, Concord.—Very good. Made by M. Poeschel.

No. 32, Concord.—Good. Made by Dr. A. Hammer.

No. 63, Concord.—As poor as possible. Made by Suel Foster.

No. 64, Concord.—Rather poorer than 63. Made by Suel Foster.

No. 49, Norton.—Sour. Made by E. A. Thompson, Cincinnati, Ohio.

No. 56, Norton.—Indifferent. Made by American Wine Company, St. Louis.

No, 4, Norton.—Good. Made by M. Poeschel.

No. 54, Norton.—Sour. Made by Theo. Engelmann.

No. 11, Norton.—Very good. Made by Geo. Nestel, Mascoutah, Illinois.

No. 5, Norton.—Only good. Made by M. Poeschel.

No. 26, Norton.—Good. Made by George Husmann.

No. 65, Norton.—Sour. Made by ———.

No. 41, Norton.—Good. Made by Longworth Wine House.

No. 16, Norton.—Good. Made by George Husmann.

No. —, Norton.—Committee divided as to the quality. Made by ——.

No. 66, New seedling.—Promising. Made by Langendoerfer, Hermann, Missouri.

No. 67, Rentz.—Delicate and promising. Made by Sebastian Rentz, Hamilton county, Ohio.

JNO. A. WARDER, *Chairman.*
JNO. ELWANGER.

MINORITY REPORT ON RED WINES.

To C. W. SPALDING, *President of the Mississippi Valley Grape Growers' Association:*

Being fully aware of the importance of the task assigned to the several examining committees at the recent grand exhibition in St. Louis, it being their duty to give the public as much valuable information as possible, and thereby promote rapid progress in a comparatively new branch of industry, I, the undersigned, as a member of the Committee on Red Wines, beg leave to offer a minority report, as my views, derived from a twenty years' experience in the wine growing business in Missouri, differ to some extent from those of my honored colleagues.

In the first place, *Gall's* method of treating the grape juice should no further be styled an *adulteration*, but be recognized as an effort to make the best possible use of and improve the gifts of nature, supply wants, remedy deficiencies, and attain the highest perfection under the circumstances. Nature has no less and no more designed the grape for wine than barley for beer, corn for whisky, milk for butter and cheese. Like the last named articles, wine, too, is not a natural but an artificial product, and how much nature, and how much art and science are to contribute toward making wine what it ought to be, is nobody's but the producer's business. I wish the public to be highly fastidious in judging of what the producer offers. No wine should find a purchaser but such as is of a pleasant taste and flavor, and of a beneficial, recreating, and invigorating effect upon the human system. All wines that cannot stand this test should be left untouched. Beyond this simple and reasonable criterion, however, no one has a right to go. Your cultivated tongue and your sound stomach are to judge of the merits of the different wines, all theories about "natural purity" notwithstanding.

Since such high authorities as Babo have declared themselves in favor of Gall's method there is not the least prospect that gallizing and chaptalizing will ever be abandoned. Wherever that method is judiciously and understandingly practiced, sour, harsh, and inferior wines disappear; nor are wines any further poisoned by such pernicious admixtures as acetate of lead, etc., or otherwise adulterated by injurious drugs, and a much better and more wholesome article is offered to the public at reduced prices. Is there any good reason to complain of such result?

Which are the principle ingredients of wine?

1. *Water*, from 70 to 85 per cent. Whether this water was absorbed by the rootlets and leaves of the vine, or is taken out of a river or cistern, makes not the least difference—water is water.

2. *Tartaric acid*, a well known chemical compound, always the same, whether gained from red or white wines, out of poor or rich must.

3. Some little *grape sugar*. Chemistry has taught that the elements of grape sugar (carbon, hydrogen, and oxygen) are the same, whether it was formed in the grape by nature or prepared out of potato starch, or out of wheat bran, or by the fermenting process converted from cane sugar.

4. A lesser or greater amount of *alcohol*, into which a larger portion of the saccharine matter in the must was transformed. Alcohol is chemically the same, from whatever substance it may be gained.

5. A small remnant of the *fermenting matter* (gluten), which gives the wine body.

6. Some *tannin*, *glycerine*, *coloring matter*, etc., etc.

7. *Oinanth ether* and other aromatic substances, peculiar in character and quantity, according to the grape varieties, to climate, soil, and position of the vineyard, and the more or less favorable seasons, and more than all else imparting to the wines their peculiar flavor, *boquet*, character, and merit. These aromatic matters, formed and developed by the operation of the acids in the must upon the alcohol during the fermenting process, cannot be artificially supplied, and no one should try to do so.

The best must, under proper treatment, will yield the best wine. Now, what is the object of *gallizing?* Not to "sweeten" the wine, not to increase its quantity (though the increasing is an unavoidable result of which no mortal can have good reason to complain), but to bring the juice of such grapes as then and there can be grown as near as possible to the standard of *normal must* (say Johannisberger, Riessling, Tokay, Burgundy, etc.) Unless this is done, in a great many cases you will produce an inferior article, hardly deserving the name of wine; or, if you will confine yourselves to the most "generous" grapes, to be grown only in the most favored parts of the world, wine will remain an article of luxury accessible only by the well-filled purse of the wealthy aristocrat.

In Europe, the chief object of gallizing is to reduce the natural acidity and astringency or hardness, while in this country we are more under the necessity of improving the *flavor*. Our American grapes, even the most generous of them (Delaware, Herbemont, etc.,) not excepted, contain a superabundance of the aromatic substance which makes our wines less palatable or even repugnant to the refined taste. And such is the effect of our climate that also in the fruit of the imported varieties an excess of flavor is found which damages the wine. What can be done to remedy this? There is only one means, as harmless as effective, namely, *dilution*.

To dilute (gallize) properly, and with the desired effect, requires considerable care, experience, and skillfulness; otherwise this procedure will degenerate into a mean drugging business. The flavor ought to be developed to its highest nicety; enough of the tartaric acid, of the tannin and other ingredients ought to remain, and just enough of the saccharine substance ought to be added to give the wine the necessary spirituous strength. Nothing "foreign" is admixed, but the too strong aroma and the acidity are brought down to the proper proportion. Thus, as it becomes rational beings, we judiciously improve nature's raw gifts, as we are used to do in so many other instances.

And now let *facts* speak—I mean the facts stated in the majority report.

The samples of *Concord* No. 1, 13, 63, and 64 were *genuine*, unmixed wines, but by the committee unanimously pronounced to be "inferior," "poor," and "very poor." Shall we, then, abandon the Concord, this grape of so many excellent qualities, because of a prejudice that forbids us to remedy its deficiencies? At the same time the samples No. 15, 52, 31, 37, 7, and 32 were declared to be "good," "very good," "fair," and "fine," and why? They were more or less judiciously *gallized;* in fact, some of these samples could favorably compare in nicety of flavor and pleasant taste with the best imported wines. Now, if such wines, being healthy, palatable, and leaving nothing to desire, can be bought at $1.50 a gallon, and sold to the consumer at fifty or even forty cents a bottle, while the miserable stuff, pure and unmixed and undrinkable, just therefore could not be procured for less than double that price, shall we still anathematize Gall's teachings?

I have yet a word to say on the samples No. 33 and 44.

Dr. Hammer's "*Missouri black rose*" (No. 33) is something entirely new. Being the only one acquainted with the origin of this wine, I told my colleagues that it was gained from the Norton's Virginia grape, nothing admixed but what Gall recommends; but the gallizing process, conducted according to a new chemical principle, whereby this wine, not only in my own opinion, but according to the judgment of many persons of the most refined taste, has attained an excellency, chiefly in flavor, *bouquet*, and spirit, surpassing everything as yet produced in this new world. Some time since I had found out that the Norton's Virginia grape, beside the materials yielding the well known and justly appreciated leading wine, contains a considerable portion of the so-called Madeira resin, which, however, it being hard to dissolve, is entirely lost by the ordinary method of fermentation. I spoke about it to Dr. Hammer, and he set his brains to work to find out a chemical means to dissolve and fully develop the Madeira stuff of the said grape, wherein, as it appears, he has succeeded beyond my expectation. His black rose (a very appropriate name with regard to the color of the wine) is a beverage intermediate between the port and Madeira, of about the same strength, destined, as I believe, to be used in cases when something stronger than ordinary wine and more generous than ardent spirits is desired. A brilliant future is awaiting the black rose of Missouri.

Number 44 was a fair sample of Ives' seedling wine, not superior, however, in my judgment, to Clinton, and not coming near the excellency of first-rate Norton's Virginia or Cynthiana. The Ives grape contains too much of acidity, and somewhat foxy flavor, and so does the wine, whose quality might perhaps be considerably improved by a different treatment.

All this is respectfully submitted by

FREDERICK MUENCH.

REPORT ON CATAWBA WINE, STILL AND SPARKLING.

The committee have examined the samples of Catawba wine presented for our inspection; thirteen specimens of still wine, and three samples of sparkling.

We have indicated the quality of these samples, or the degrees of excellence, by figures ranging from fifty to one hundred, each member marking privately, and the average being determined, was marked opposite the figure or number marked upon the particular sample as the test.

STILL WINE.

			Average.
No. 61,	made by	St. Louis Park of Fruits	75
No. 55,	"	Theo. Engelman	83
No. 18,	"	Geo. Husmann	74
No. 48,	"	E. A. Thompson, Cincinnati	70
No. 57,	"	American Wine Company	66
No. 29,	"	Geo. Husmann	95
No. 34,	"	John Fliesh, Hermann	90
No. 9,	"	M. Poeschel "	84
No. 36,	"	Jacob Kahn, "	84
No. 30,	"	Jacob Doyenner, "	75
No. 43,	"	Longworth Wine House	69
No. 12,	"	J. F. Walter, St. Louis county	80
No. 35,	"	Jacob Kahn	72

SPARKLING.

No. 45,	made by	Longworth Wine House	87
No. 58,	"	American Wine Company, St. Louis	88
No. 59,	"	" " " "	89

The committee beg leave to submit this report without comment, further than to observe that the best of these samples (which are regarded as indications of what the poorer might and ought to have been) carry with them the assurance that the culture of the Catawba grape, where it can be successfully grown, is not likely very soon to be abandoned.

WM. GRIFFITH, *Chairman.*
WM. HEAVER,
WILLIAM SAUNDERS.

REPORT ON WHITE WINES OTHER THAN CATAWBA.

The specimens were fourteen in number and were tested in the following order:

Rogers' Multivine Wine, No. 47.—Of indifferent quality. Made by Wm. Wiswall, Alabama.

Scuppernong, No. 40.—The grape is regarded as possessing wine-making qualities, but the specimen presented had been sugared. Made by Burbank, Gallagher & Co., N. O.

Hartford, No. 21.—A thin, light wine, of moderate quality. Made by George Husmann.

Cassady, No. 24.—A white wine of good promise, allied to the Rhine wines. Made by George Husmann.

Taylor, No. 2 (made by M. Poeschel), *and No.* 22 (made by Geo. Husmann).—Not of first quality. No. 22 rather the better of the two samples.

North Carolina Seedling, No. 25.—A wine of good promise; the sample rather new. Made by George Husmann.

Cunningham, No. 23.—This was regarded as a wine of fine promise. Made by George Husmann.

Rulander, No. 3.—The specimen heavily gallized. Made by M. Poeschel.

Delaware, No. 17, *vintage of* 1865.—Not as good a wine as this grape is capable of making. Made by George Husmann.

Herbemont, No. 28 (made by Geo. Husmann), *No.* 53 (made by Theo. Engelman), *No.* 14 (made by Geo. Husmann), *and No.* 8 (made by M. Peoschel).—No. 14 is a white wine of great promise. The other three were somewhat colored, and rather rough from having been fermented on the skin, but will probably improve with age.

The committee regard the majority of the samples submitted to them as indicating great progress in wine making, and feel that there is great encouragement for those engaged in this important branch of industry to continue in the work in which they have already achieved such favorable results.

MARSHAL P. WILDER, *Chairman.*
GEORGE THURBER,
ROBERT BUIST.

The number of bottles comprising each sample ranged from one to twelve. This very commendable liberality on the part of the exhibitors enabled the Grape Growers' Association to terminate their exhibition by inviting the members of the American Pomological Society and all others present to partake of the very bountiful supply, which proved ample for the purpose, and constituted a new feature of interest to the meeting of that society.

WILLIAM MUIR, *Secretary.*

C. W. SPALDING, *President.*

INDEX.

PAGE.

Agricultural College Lands—
  Where located ... ix
  Condition and value of ... 15 18

Agricultural Education—
  Address on, by Professor Swallow ... 204
  Address on, to the State, by citizens of Boone county ... 209
  Provisions for, under foreign governments ... 212
  Report of Committee on Agricultural and Mechanical Colleges ... 419

Agriculture—
  Address on, by J. H. Klippart ... 251
  Condition of, in the State ... 32
  Progress of, in Prussia, translation by Professor Smith ... 243

Apples—
  Discussion on varieties of ... 375, 407, 414 424

Apple Growing—
  Address on, by Major Brooks ... 81
  Report on O. H. P. Lear's orchard ... 86

Apple Worm, etc. ... 50

Bark Lice ... 61

Blackberry—
  Varieties and culture of ... 381

Caves—
  In Missouri ... 201
  For wine cellars ... 227

Capron, Hon. Horace—
  Letter from, relating to organized co-operation ... 277

Caterpillar—
  Zebra ... 69
  American Procris ... 69
  Grape vine Selandria ... 70

Cherries—
  Discussion on ... 412

Cisterns—
  How to make ... 28

Clod Crusher ... 49

Codling Moth ... 67

CORRESPONDING SECRETARY— PAGE.
Report of 27

CORNCOB BORER 69

COUNTY REPORTS—
Audrain 280
Benton 283
Butler 285
Cape Girardeau 287
Gentry 293
Holt 295
Jackson, by J. P. A. 299
" by Chas. Long 301
Jasper 304
Jefferson 306
Lawrence 308
Madison 309
Marion 312
Mercer 314
Mississippi 316
Morgan 320
Monroe 322
McDonald 324
Newton 327
Pike 330
Pulaski 334
Ripley 335
St. Clair 337
Ste. Genevieve 338
Stoddard 339
Vernon 341
Warren 344
Washington 344

COUNTY SOCIETIES—
Laws relating to 275
Hints to 279

CURCULIO 65

CURRANTS—
Varieties and culture of 382

DROUTH—
Seasons of 27

EVENTS, WEATHER, ETC 25

ENTOMOLOGY—
Report of committee on 56

FARM ACCOUNTS—
Importance of 41

FARMERS' WIVES AND DAUGHTERS—
Essay on, by Mrs. R. E. Smith 118

FARMERS' SONS—
Essay on, by same 120

FAIR GROUNDS—
How to improve 257

	PAGE.
FACTS FOR THOUGHT—	
By Rev. M. W. Willis	269
FLAX—	
Land for	166
Preparation of land for	167
Seed for sowing	168
Mode of sowing	170
Does it exhaust the soil?	171
Harvesting	172
Threshing	173
Rotting	176
Breaking and cleaning	178
GRAPE CULTURE IN MISSOURI—	
By Prof. Swallow	215
Soil for	216 223
Climate for	218 222
Different varieties	219
Natural terraces for	226
GALLIZING	399
GRAPES—	
Weight of must in different varieties	385
GRASS—	
In Monroe county	324
HEMP—	
Land for	181
Preparation of land for	182
Sowing	183
Planting seed	185
Varieties of stock	187
Harvesting	188
Rotting	189
Preparing for market	190
HEDGE, OSAGE ORANGE—	
How to plant and train	43
HORTICULTURE—	
Address on, by Prof. S. Smith	105
HORTICULTURAL ASSOCIATION—	
Utility of	356
Social advantages of	357
HOP GROWING	87
INDUSTRIAL UNIVERSITY—	
Communication on location, organization, and government of	19
INSECTS—	
Depredations of	415
LEAF FOLDER, ETC	70
MANTIS, PRAYING	54
MANUFACTURES—	
Importance of	32

PAGE.
  Article on, by B. Fairchild 191

Minerals of Missouri—
  Address on, by R. S. Eliot 228
  Coal 230
  Iron 233
  Lead 237
  Copper 239
  Tin, copper, etc 241

Missouri Horticultural Society—
  Proceedings of 348
  Annual address by the President of 348
  Secretary's report 350
  Treasurer's report 352
  List of members of for 1867 352
  Election of officers 373
  Constitution and by-laws of 427

Mississippi Valley Grape Growers' Association—
  Proceedings of 430
  Preliminary meeting of 430
  Circular of 431
  Constitution of 432
  Officers of 433

Orchards—
  Report on 374

Paints and Clays—
  By G. C. Broadhead 200

Peach—
  Essay on, by W. C. Flagg 359
  List of 363 425
  List of, with time of ripening 393
  Boxes for marketing 362
  Discussions on 366, 370 413

Pears—
  List of, recommended 425

Peach Orchards—
  In Michigan, by W. C. Flagg 111

Potato Beetle 57

Raspberry—
  Varieties and culture of 380

Spanish Fever 348

Standing Committees—
  Of State Horticultural Society 421

Strawberries—
  Discussion on varieties and mode of culture 377

State Board of Agriculture—
  Proceedings of 11
  Report of Treasurer of 12
  Awarding prize for essay 13

PAGE.

Election of members 14

STATE ENTOMOLOGIST—

Appointment of urged 17, 411 417

STATE GEOLOGIST—

Appointment of urged 17

SHEEP HUSBANDRY IN MISSOURI—

By S. P. Boardman 123
Tagging 127
Cutting hoofs 127
Herding 128
Folds and folding 128
Raising lambs 129
Doctoring and castration 132
Washing 132
Shearing 134
Weaning lambs 136
Breeds, breeding, bucks 137
Coupling 140
Selling culls 141
Fall management 142
Racks, troughs, fence, sheds 144
Winter feeding 146
Diseases and doctoring 150

SWEET POTATO—

Ridger 47
Enemies to 60

SORGHUM AND ITS PRODUCTS—

Review of Stewart's book 92

SOUTHEAST MISSOURI—

Historical sketch of 262
Its settlement, mines, etc. 263

TRANSPLANTING—

By J. M. Jordan 406
Of vines 409

TICE—

On dry weather springs 29

TIMBER—

Importance of, and mode of cultivating on prairies 35 40

TOMATO—

Worm 68

VINEYARDS—

Report on, by G. H. 383
Increase of 386
Their relation to the temperance reform (address by Rev. C. Peabody) 387

WILD GRAPES 325

WINE— PAGE.

Report on gallizing, by W. C. Flagg........ 395
Report of committee on, before the State Horticultural Society........ 422
Report on red wines........ 435, 437, 442 446
Report on white wines........ 436
Purity of........ 438
Report on Catawba........ 445

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